

Service
Service
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Service Manual

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1. Revision List

Manual xxxx xxx xxxx.0

- First release.

Manual xxxx xxx xxxx.1

- **Chapter 2:** [Table 2-1](#) updated (added Berlinale CTNs).
- **Chapter 4:** added wiring diagrams; see section [4.1](#).
- **Chapter 6:** added white tone alignment data, see section [6.3](#).
- **Chapter 7:** added Berlinale architecture diagrams; see section [7.1](#).

2. Technical Specifications and Connections

Index of this chapter:

[2.1 Technical Specifications](#)
[2.2 Directions for Use](#)
[2.3 Connections](#)

2.1 Technical Specifications

For on-line product support please use the links in [Table 2-1](#). Here is product information available, as well as getting started, user manuals, frequently asked questions and software & drivers.

Notes:

- Figures can deviate due to the different set executions.
- Specifications are indicative (subject to change).

Table 2-1 Described Model Numbers and Diversity

CTN	Styling	SSB	2	4			9						10									
				Mechanics			Block Diagrams						Schematics									
				Wire Dressing	Assembly Removal	LCD Removal	Wiring Diagram	Video	Audio	Control & Clock	I2C	Supply lines	B01 (DC-DC)	B02 (Tuner & Dig. Dem.)	B03 (Class D & mute)	B04 (Power, DDR, LVDS)	B05 (HDMI, USB)	B06 (analog I/O, VGA)	B07 (Hospitality)	E (Keyboard/Leading Edge)	J (IR/LED)	T01 (LVDS Display, TCON)
32PFL3406D/78	Thriller 11-1	65052	2-1	4-1	4.3	4.3.2	9-1	9-5	9-6	9-7	9-8	9-9	10-1	10-2	10-3	10-4	10-5	10-6	10-7	10-18	10-19	-
32PFL3606D/78	Thriller 11-1	65052	2-1	4-1	4.3	4.3.2	9-1	9-5	9-6	9-7	9-8	9-9	10-1	10-2	10-3	10-4	10-5	10-6	10-7	10-18	10-19	-
32PFL5606D/77	Berlinale 11-3	65231	2-2	4-3	4.4	4.4.8	9-3	9-10	9-11	9-12	9-13	9-14	10-9	10-10	10-11	10-12	10-13	10-14	10-15	10-17	-	-
32PFL5606D/78	Berlinale 11-3	65231	2-2	4-3	4.4	4.4.8	9-3	9-10	9-11	9-12	9-13	9-14	10-9	10-10	10-11	10-12	10-13	10-14	10-15	10-17	-	-
40PFL3606D/78	Thriller 11-2	65052	2-1	4-2	4.3	4.3.2	9-2	9-5	9-6	9-7	9-8	9-9	10-1	10-2	10-3	10-4	10-5	10-6	10-7	10-18	10-19	10-20 10-21
40PFL5606D/77	Berlinale 11-4	65231	2-2	4-4	4.4	4.4.8	9-4	9-10	9-11	9-12	9-13	9-14	10-9	10-10	10-11	10-12	10-13	10-14	10-15	10-17	-	-
40PFL5606D/78	Berlinale 11-4	65231	2-2	4-4	4.4	4.4.8	9-4	9-10	9-11	9-12	9-13	9-14	10-9	10-10	10-11	10-12	10-13	10-14	10-15	10-17	-	-

2.2 Directions for Use

You can download this information from the following websites:

<http://www.philips.com/support>
<http://www.p4c.philips.com>

2.3 Connections

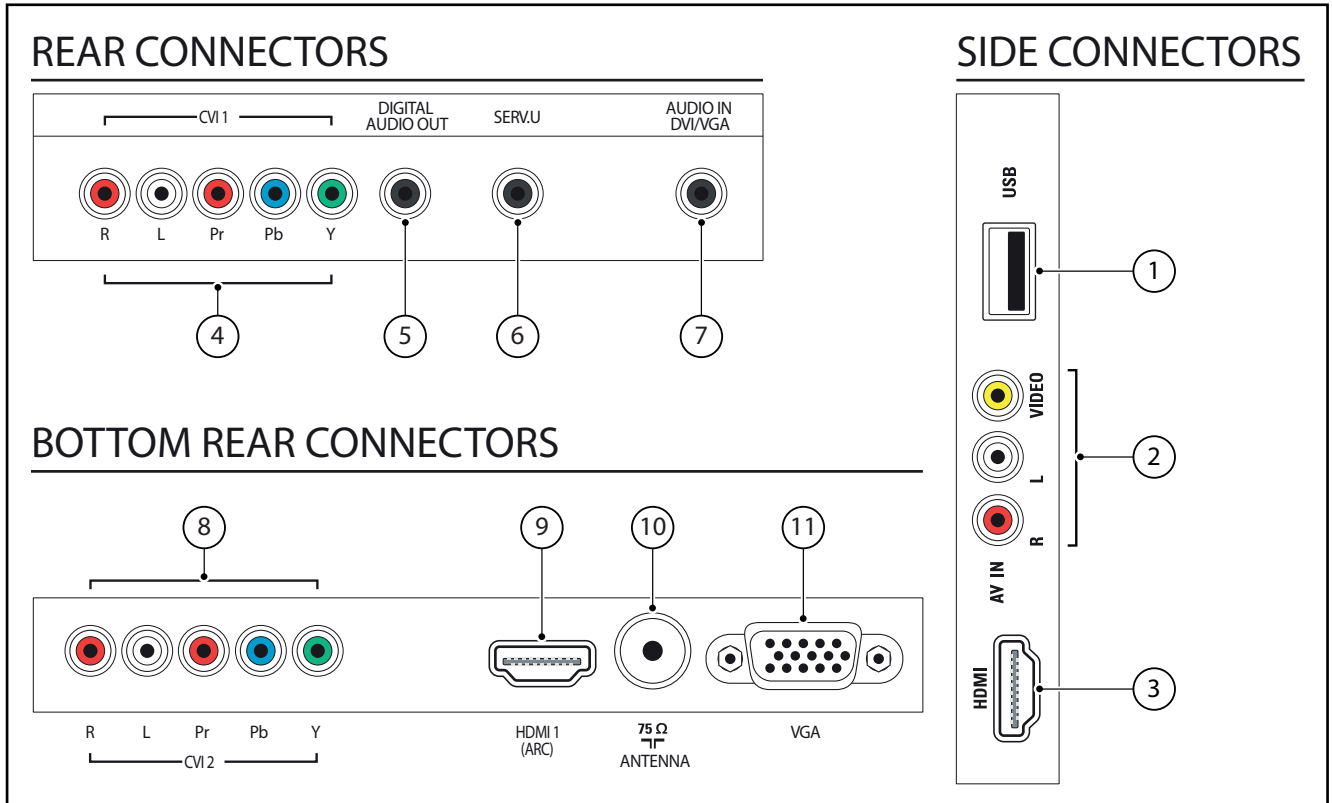


Figure 2-1 Connection overview Thriller (xxPFL3x06/xx)

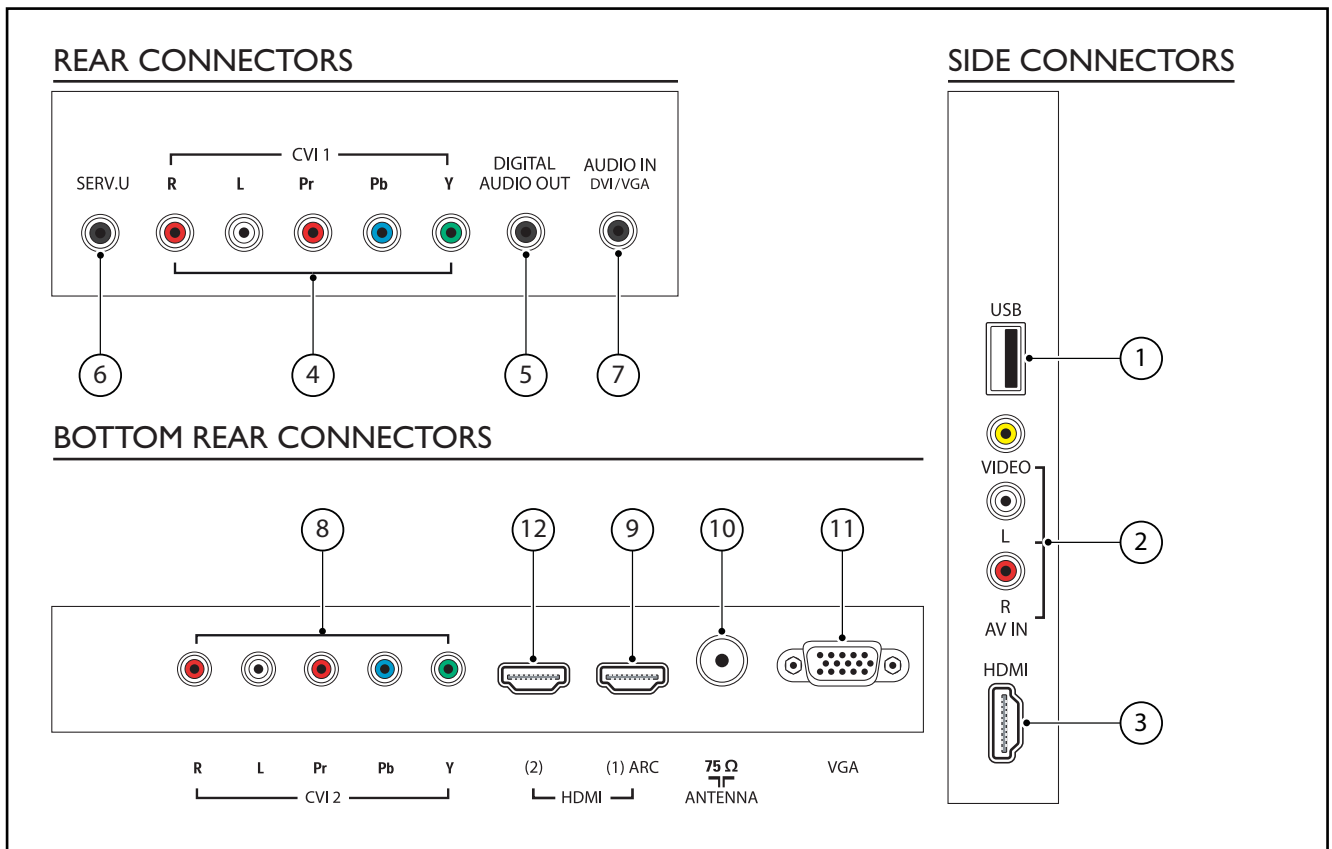


Figure 2-2 Connection overview Berlinale (xxPFL5x06/xx)

Note: The following connector color abbreviations are used (according to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, Ye= Yellow.

2.3.1 Side Connections

1 - USB2.0

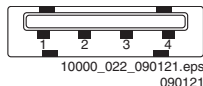
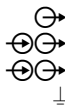


Figure 2-3 USB (type A)

1	- +5V	
2	- Data (-)	
3	- Data (+)	
4	- Ground	Gnd



2 - AV IN: Cinch: Video CVBS - In, Audio - In

Ye	- Video CVBS	1 V _{PP} / 75 ohm
Wh	- Audio L	0.5 V _{RMS} / 10 kohm
Rd	- Audio R	0.5 V _{RMS} / 10 kohm



3 - HDMI: Digital Video, Digital Audio - In

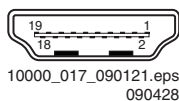
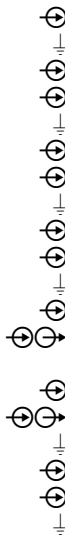


Figure 2-4 HDMI (type A) connector

1	- D2+	Data channel
2	- Shield	Gnd
3	- D2-	Data channel
4	- D1+	Data channel
5	- Shield	Gnd
6	- D1-	Data channel
7	- D0+	Data channel
8	- Shield	Gnd
9	- D0-	Data channel
10	- CLK+	Data channel
11	- Shield	Gnd
12	- CLK-	Data channel
13	- Easylink	Control channel/CEC
14	- n.c.	
15	- DDC_SCL	DDC clock
16	- DDC_SDA	DDC data
17	- Ground	Gnd
18	- +5V	
19	- HPD	Hot Plug Detect
20	- Ground	Gnd



2.3.2 Rear Connections

4 - CVI-1: Cinch: Video YPbPr - In, Audio - In

Wh	- Audio - L	0.5 V _{RMS} / 10 kΩ
Rd	- Audio - R	0.5 V _{RMS} / 10 kΩ
Rd	- Video Pr	0.7 V _{PP} / 75 Ω
Bu	- Video Pb	0.7 V _{PP} / 75 Ω
Gn	- Video Y	1 V _{PP} / 75 Ω



5 - Cinch: Digital Audio - Out

Bk	- Coaxial	0.4 - 0.6 V _{PP} / 75 ohm
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6 - Service Connector (UART)

1	- Ground	Gnd
2	- UART_TX	Transmit
3	- UART_RX	Receive



7 - Mini Jack: Audio - In DVI/VGA

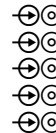
Bk	- Audio	0.5 V _{RMS} / 10 kΩ
----	---------	------------------------------



2.3.3 Bottom Connections

8 - CVI-2: Cinch: Video YPbPr - In, Audio - In

Wh	- Audio - L	0.5 V _{RMS} / 10 kΩ
Rd	- Audio - R	0.5 V _{RMS} / 10 kΩ
Rd	- Video Pr	0.7 V _{PP} / 75 Ω
Bu	- Video Pb	0.7 V _{PP} / 75 Ω
Gn	- Video Y	1 V _{PP} / 75 Ω



9 - HDMI1 Audio Return Channel: Digital Video, Digital Audio - In

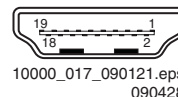
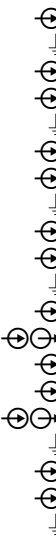


Figure 2-5 HDMI (type A) connector

1	- D2+	Data channel
2	- Shield	Gnd
3	- D2-	Data channel
4	- D1+	Data channel
5	- Shield	Gnd
6	- D1-	Data channel
7	- D0+	Data channel
8	- Shield	Gnd
9	- D0-	Data channel
10	- CLK+	Data channel
11	- Shield	Gnd
12	- CLK-	Data channel
13	- Easylink	Control channel/CEC
14	- ARC	Audio Return Channel
15	- DDC_SCL	DDC clock
16	- DDC_SDA	DDC data
17	- Ground	Gnd
18	- +5V	
19	- HPD	Hot Plug Detect
20	- Ground	Gnd



10 - Aerial - In

-	- F-type	Coax, 75 Ω
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11 - VGA: Video RGB - In

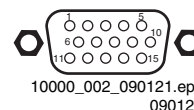


Figure 2-6 VGA Connector

1	- Video Red	0.7 V _{PP} / 75 Ω
2	- Video Green	0.7 V _{PP} / 75 Ω
3	- Video Blue	0.7 V _{PP} / 75 Ω
4	- n.c.	
5	- Ground	Gnd
6	- Ground Red	Gnd
7	- Ground Green	Gnd
8	- Ground Blue	Gnd
9	- +5V _{DC}	+5 V
10	- Ground Sync	Gnd
11	- n.c.	
12	- DDC_SDA	DDC data
13	- H-sync	0 - 5 V
14	- V-sync	0 - 5 V
15	- DDC_SCL	DDC clock



12 - HDMI2: Digital Video, Digital Audio - In (optional)

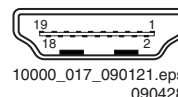





















Figure 2-7 HDMI (type A) connector

1	- D2+	Data channel	
2	- Shield	Gnd	
3	- D2-	Data channel	
4	- D1+	Data channel	
5	- Shield	Gnd	
6	- D1-	Data channel	
7	- D0+	Data channel	
8	- Shield	Gnd	
9	- D0-	Data channel	
10	- CLK+	Data channel	
11	- Shield	Gnd	
12	- CLK-	Data channel	
13	- Easylink	Control channel/CEC	
14	- n.c.		
15	- DDC_SCL	DDC clock	
16	- DDC_SDA	DDC data	
17	- Ground	Gnd	
18	- +5V		
19	- HPD	Hot Plug Detect	
20	- Ground	Gnd	

3. Precautions, Notes, and Abbreviation List

Index of this chapter:

[3.1 Safety Instructions](#)

[3.2 Warnings](#)

[3.3 Notes](#)

[3.4 Abbreviation List](#)

3.1 Safety Instructions

Safety regulations require the following **during** a repair:

- Connect the set to the Mains/AC Power via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ▲, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the Mains/AC Power lead for external damage.
- Check the strain relief of the Mains/AC Power cord for proper function.
- Check the electrical DC resistance between the Mains/AC Power plug and the secondary side (only for sets that have a Mains/AC Power isolated power supply):
 1. Unplug the Mains/AC Power cord and connect a wire between the two pins of the Mains/AC Power plug.
 2. Set the Mains/AC Power switch to the "on" position (keep the Mains/AC Power cord unplugged!).
 3. Measure the resistance value between the pins of the Mains/AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ.
 4. Switch "off" the set, and remove the wire between the two pins of the Mains/AC Power plug.
- Check the cabinet for defects, to prevent touching of any inner parts by the customer.

3.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD ▲). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched "on".
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

3.3 Notes

3.3.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⊕), or hot ground (⊖), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).

- Where necessary, measure the waveforms and voltages with (⏏) and without (⏏) aerial signal. Measure the voltages in the power supply section both in normal operation (Ⓜ) and in stand-by (Ⓜ). These values are indicated by means of the appropriate symbols.

3.3.2 Schematic Notes

- All resistor values are in ohms, and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kΩ).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 Ω).
- All capacitor values are given in micro-farads ($\mu = \times 10^{-6}$), nano-farads ($n = \times 10^{-9}$), or pico-farads ($p = \times 10^{-12}$).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed on the Philips Spare Parts Web Portal.

3.3.3 Spare Parts

For the latest spare part overview, consult your Philips Spare Part web portal.

3.3.4 BGA (Ball Grid Array) ICs

Introduction

For more information on how to handle BGA devices, visit this URL: <http://www.atyourservice-magazine.com>. Select "Magazine", then go to "Repair downloads". Here you will find information on how to deal with BGA-ICs.

BGA Temperature Profiles

For BGA-ICs, you **must** use the correct temperature-profile. Where applicable and available, this profile is added to the IC Data Sheet information section in this manual.

3.3.5 Lead-free Soldering

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able:
 - To reach a solder-tip temperature of at least 400°C.
 - To stabilize the adjusted temperature at the solder-tip.
 - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature of around 360°C - 380°C is reached and stabilized at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will increase drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch "off" unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly to **avoid** mixed regimes. If this cannot be avoided, carefully clear the solder-joint from old tin and re-solder with new tin.

3.3.6 Alternative BOM identification

It should be noted that on the European Service website, "Alternative BOM" is referred to as "Design variant".

The **third digit** in the serial number (example: AG2B0335000001) indicates the number of the alternative B.O.M. (Bill Of Materials) that has been used for producing the specific TV set. In general, it is possible that the same TV model on the market is produced with e.g. two different types of displays, coming from two different suppliers. This will then result in sets which have the same CTN (Commercial Type Number; e.g. 28PW9515/12) but which have a different B.O.M. number.

By looking at the third digit of the serial number, one can identify which B.O.M. is used for the TV set he is working with. If the third digit of the serial number contains the number "1" (example: AG1B0335000001), then the TV set has been manufactured according to B.O.M. number 1. If the third digit is a "2" (example: AG2B0335000001), then the set has been produced according to B.O.M. no. 2. This is important for ordering the correct spare parts!

For the third digit, the numbers 1...9 and the characters A...Z can be used, so in total: 9 plus 26 = 35 different B.O.M.s can be indicated by the third digit of the serial number.

Identification: The bottom line of a type plate gives a 14-digit serial number. Digits 1 and 2 refer to the production centre (e.g. SN is Lysomice, RJ is Kobierzyce), digit 3 refers to the B.O.M. code, digit 4 refers to the Service version change code, digits 5 and 6 refer to the production year, and digits 7 and 8 refer to production week (in example below it is 2010 week 10 / 2010 week 17). The 6 last digits contain the serial number.



Figure 3-1 Serial number (example)

3.3.7 Board Level Repair (BLR) or Component Level Repair (CLR)

If a board is defective, consult your repair procedure to decide if the board has to be exchanged or if it should be repaired on component level.

If your repair procedure says the board should be exchanged completely, do not solder on the defective board. Otherwise, it cannot be returned to the O.E.M. supplier for back charging!

3.3.8 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages.** While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a

powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

3.4 Abbreviation List

0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV), 6 = play 16 : 9 format, 12 = play 4 : 3 format
AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeps the original aspect ratio
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ASF	Auto Screen Fit: algorithm that adapts aspect ratio to remove horizontal black bars without discarding video information
ATSC	Advanced Television Systems Committee, the digital TV standard in the USA
ATV	See Auto TV
Auto TV	A hardware and software control system that measures picture content, and adapts image parameters in a dynamic way
AV	External Audio Video
AVC	Audio Video Controller
AVIP	Audio Video Input Processor
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BDS	Business Display Solutions (iTV)
BLR	Board-Level Repair
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
B-TXT	Blue Teletext
C	Centre channel (audio)
CEC	Consumer Electronics Control bus: remote control bus on HDMI connections
CL	Constant Level: audio output to connect with an external amplifier
CLR	Component Level Repair
ComPair	Computer aided rePair
CP	Connected Planet / Copy Protection
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DCM	Data Communication Module. Also referred to as System Card or Smartcard (for iTV).
DDC	See "E-DDC"

D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz		subcommittee of the International Telecommunication Union relating to radio communication. ITU-656 (a.k.a. SDI), is a digitized video format used for broadcast grade video.
DFI	Dynamic Frame Insertion		Uncompressed digital component or digital composite signals can be used.
DFU	Directions For Use: owner's manual		The SDI signal is self-synchronizing, uses 8 bit or 10 bit data words, and has a maximum data rate of 270 Mbit/s, with a minimum bandwidth of 135 MHz.
DMR	Digital Media Reader: card reader	iTV	Institutional TeleVision; TV sets for hotels, hospitals etc.
DMSD	Digital Multi Standard Decoding	LS	Last Status; The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according to the customer's preferences
DNM	Digital Natural Motion		
DNR	Digital Noise Reduction: noise reduction feature of the set		
DRAM	Dynamic RAM	LATAM	Latin America
DRM	Digital Rights Management	LCD	Liquid Crystal Display
DSP	Digital Signal Processing	LED	Light Emitting Diode
DST	Dealer Service Tool: special remote control designed for service technicians	L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
DTCP	Digital Transmission Content Protection; A protocol for protecting digital audio/video content that is traversing a high speed serial bus, such as IEEE-1394	LPL	LG.Philips LCD (supplier)
DVB-C	Digital Video Broadcast - Cable	LS	Loudspeaker
DVB-T	Digital Video Broadcast - Terrestrial	LVDS	Low Voltage Differential Signalling
DVD	Digital Versatile Disc	Mbps	Mega bits per second
DVI(-d)	Digital Visual Interface (d= digital only)	M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
E-DDC	Enhanced Display Data Channel (VESA standard for communication channel and display). Using E-DDC, the video source can read the EDID information form the display.	MHEG	Part of a set of international standards related to the presentation of multimedia information, standardised by the Multimedia and Hypermedia Experts Group. It is commonly used as a language to describe interactive television services
EDID	Extended Display Identification Data (VESA standard)	MIPS	Microprocessor without Interlocked Pipeline-Stages; A RISC-based microprocessor
EEPROM	Electrically Erasable and Programmable Read Only Memory	MOP	Matrix Output Processor
EMI	Electro Magnetic Interference	MOSFET	Metal Oxide Silicon Field Effect Transistor, switching device
EPG	Electronic Program Guide	MPEG	Motion Pictures Experts Group
EPLD	Erasable Programmable Logic Device	MPIF	Multi Platform InterFace
EU	Europe	MUTE	MUTE Line
EXT	EXternal (source), entering the set by SCART or by cinches (jacks)	MTV	Mainstream TV: TV-mode with Consumer TV features enabled (iTV)
FDS	Full Dual Screen (same as FDW)	NC	Not Connected
FDW	Full Dual Window (same as FDS)	NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
FLASH	FLASH memory	NTC	Negative Temperature Coefficient, non-linear resistor
FM	Field Memory or Frequency Modulation	NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N= 3.579545 MHz, NTSC 4.43= 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
FPGA	Field-Programmable Gate Array	NVM	Non-Volatile Memory: IC containing TV related data such as alignments
FTV	Flat TeleVision	O/C	Open Circuit
Gb/s	Giga bits per second	OSD	On Screen Display
G-TXT	Green TeleteXT	OAD	Over the Air Download. Method of software upgrade via RF transmission. Upgrade software is broadcasted in TS with TV channels.
H	H_sync to the module	OTC	On screen display Teletext and Control; also called Artistic (SAA5800)
HD	High Definition	P50	Project 50: communication protocol between TV and peripherals
HDD	Hard Disk Drive		
HDCP	High-bandwidth Digital Content Protection: A "key" encoded into the HDMI/DVI signal that prevents video data piracy. If a source is HDCP coded and connected via HDMI/DVI without the proper HDCP decoding, the picture is put into a "snow vision" mode or changed to a low resolution. For normal content distribution the source and the display device must be enabled for HDCP "software key" decoding.		
HDMI	High Definition Multimedia Interface		
HP	HeadPhone		
I	Monochrome TV system. Sound carrier distance is 6.0 MHz		
I ² C	Inter IC bus		
I ² D	Inter IC Data bus		
I ² S	Inter IC Sound bus		
IF	Intermediate Frequency		
IR	Infra Red		
IRQ	Interrupt Request		
ITU-656	The ITU Radio communication Sector (ITU-R) is a standards body		

PAL	Phase Alternating Line. Color system mainly used in West Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)	SSC	Spread Spectrum Clocking, used to reduce the effects of EMI
PCB	Printed Circuit Board (same as "PWB")	STB	Set Top Box
PCM	Pulse Code Modulation	STBY	STand-BY
PDP	Plasma Display Panel	SVGA	800 × 600 (4:3)
PFC	Power Factor Corrector (or Pre-conditioner)	SVHS	Super Video Home System
PIP	Picture In Picture	SW	Software
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency	SWAN	Spatial temporal Weighted Averaging Noise reduction
POD	Point Of Deployment: a removable CAM module, implementing the CA system for a host (e.g. a TV-set)	SXGA	1280 × 1024
POR	Power On Reset, signal to reset the uP	TFT	Thin Film Transistor
PSDL	Power Supply for Direct view LED backlight with 2D-dimming	THD	Total Harmonic Distortion
PSL	Power Supply with integrated LED drivers	TMD5	Transmission Minimized Differential Signalling
PSLS	Power Supply with integrated LED drivers with added Scanning functionality	TS	Transport Stream
PTC	Positive Temperature Coefficient, non-linear resistor	TXT	TeleteXT
PWB	Printed Wiring Board (same as "PCB")	TXT-DW	Dual Window with TeleteXT
PWM	Pulse Width Modulation	UI	User Interface
QRC	Quasi Resonant Converter	uP	Microprocessor
QTNR	Quality Temporal Noise Reduction	UXGA	1600 × 1200 (4:3)
QVCP	Quality Video Composition Processor	V	V-sync to the module
RAM	Random Access Memory	VESA	Video Electronics Standards Association
RGB	Red, Green, and Blue. The primary color signals for TV. By mixing levels of R, G, and B, all colors (Y/C) are reproduced.	VGA	640 × 480 (4:3)
RC	Remote Control	VL	Variable Level out: processed audio output toward external amplifier
RC5 / RC6	Signal protocol from the remote control receiver	VSB	Vestigial Side Band; modulation method
RESET	RESET signal	WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
ROM	Read Only Memory	WXGA	1280 × 768 (15:9)
RSDS	Reduced Swing Differential Signalling data interface	XTAL	Quartz crystal
R-TXT	Red TeleteXT	XGA	1024 × 768 (4:3)
SAM	Service Alignment Mode	Y	Luminance signal
S/C	Short Circuit	Y/C	Luminance (Y) and Chrominance (C) signal
SCART	Syndicat des Constructeurs d'Appareils Radiorécepteurs et Téléviseurs	YPbPr	Component video. Luminance and scaled color difference signals (B-Y and R-Y)
SCL	Serial Clock I ² C	YUV	Component video
SCL-F	CLock Signal on Fast I ² C bus		
SD	Standard Definition		
SDA	Serial Data I ² C		
SDA-F	DAta Signal on Fast I ² C bus		
SDI	Serial Digital Interface, see "ITU-656"		
SDRAM	Synchronous DRAM		
SECAM	SEquence Couleur Avec Mémoire. Colour system mainly used in France and East Europe. Colour carriers = 4.406250 MHz and 4.250000 MHz		
SIF	Sound Intermediate Frequency		
SMPS	Switched Mode Power Supply		
SoC	System on Chip		
SOG	Sync On Green		
SOPS	Self Oscillating Power Supply		
SPI	Serial Peripheral Interface bus; a 4-wire synchronous serial data link standard		
S/PDIF	Sony Philips Digital InterFace		
SRAM	Static RAM		
SRP	Service Reference Protocol		
SSB	Small Signal Board		

4. Mechanical Instructions

Index of this chapter:

[4.1 Cable Dressing](#)

[4.2 Service Positions](#)

[4.3 Assy/Panel Removal \(Thriller styling: xxPFL3x06D/xx\)](#)

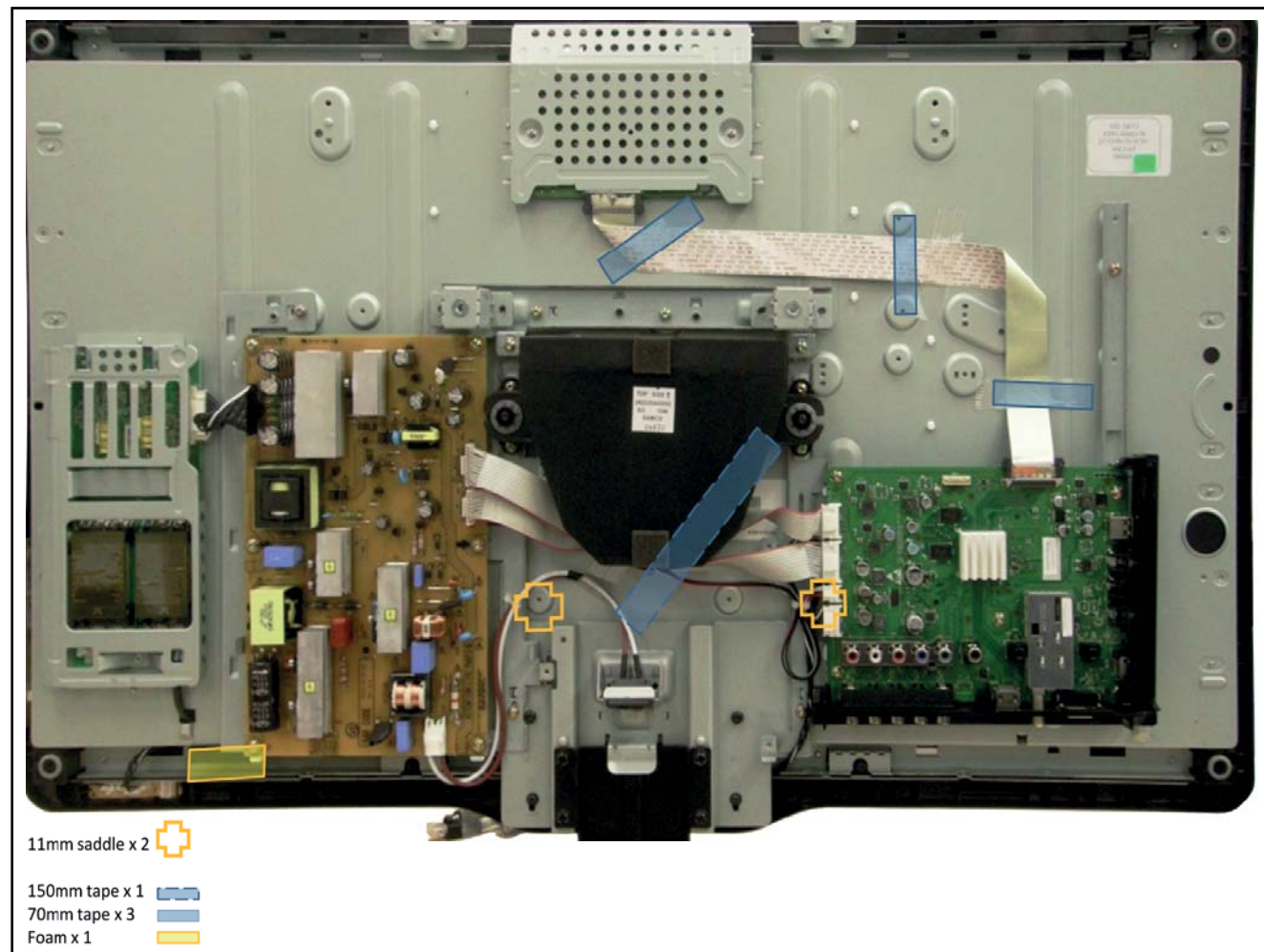
[4.4 Assy/Panel Removal \(Berlinale styling: xxPFL5x06D/xx\)](#)

[4.5 Set Re-assembly](#)

Notes:

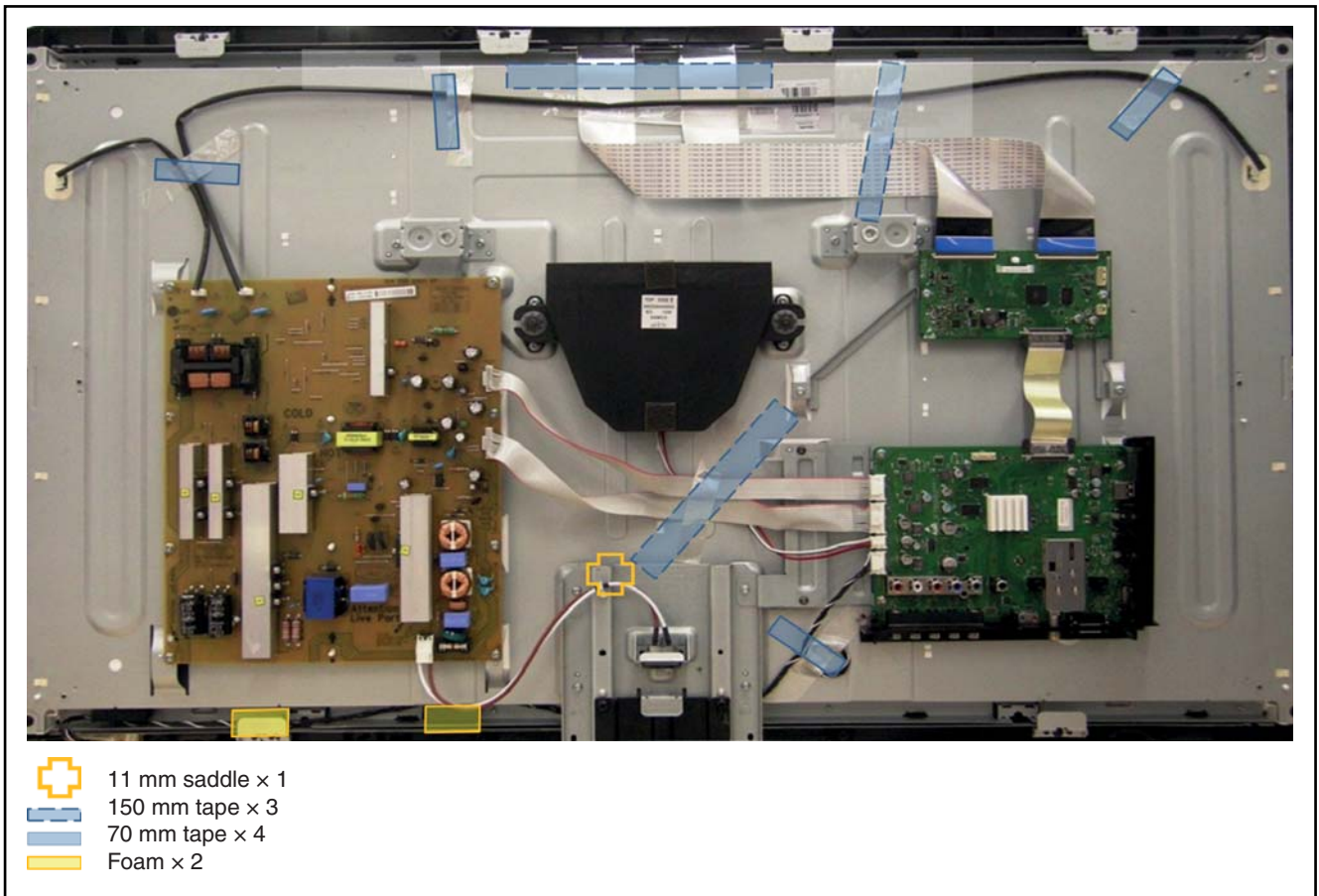
- Figures below can deviate slightly from the actual situation, due to the different set executions.

4.1 Cable Dressing



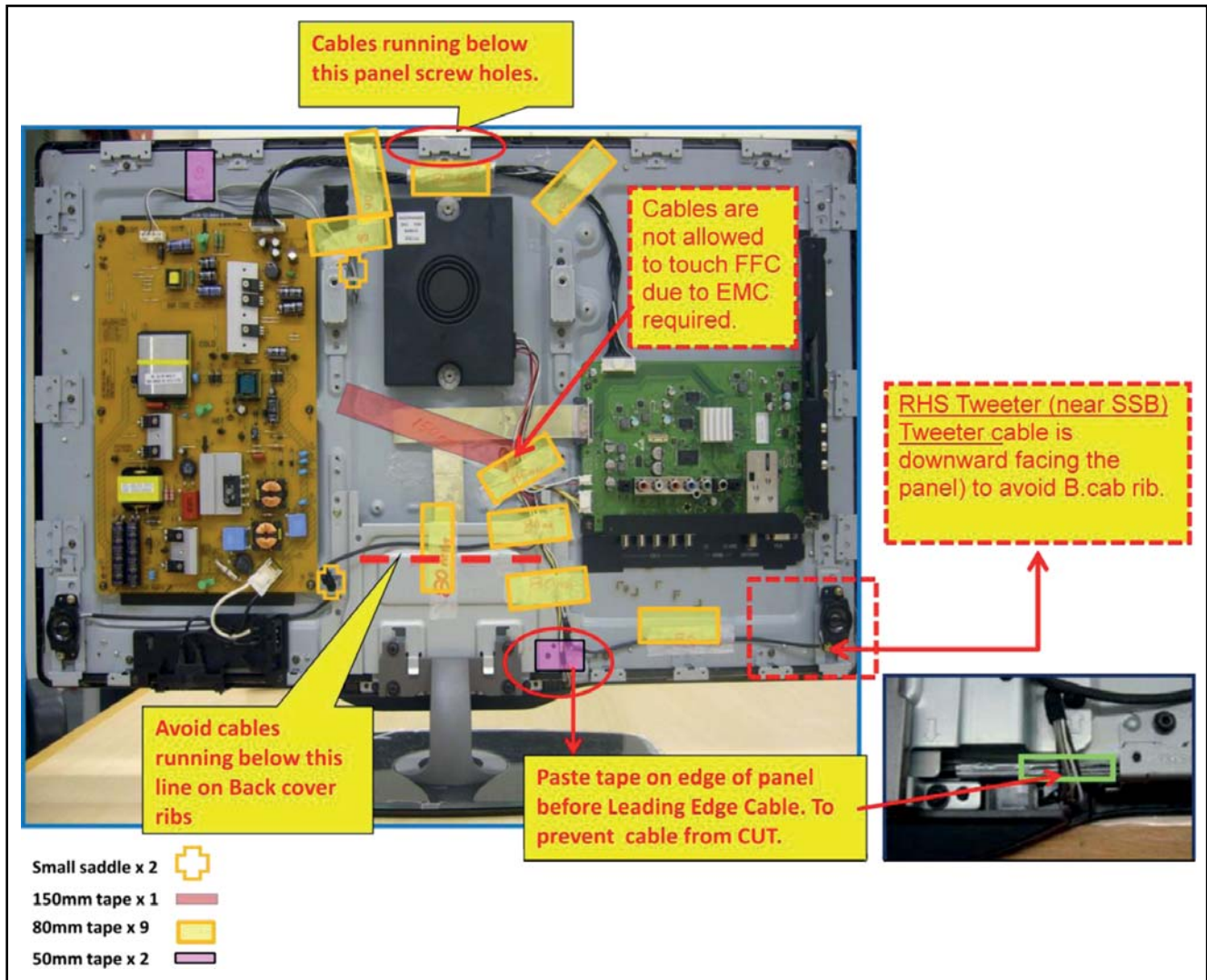
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Figure 4-1 Cable dressing 32" Thriller (xxPFL3x06D/xx)



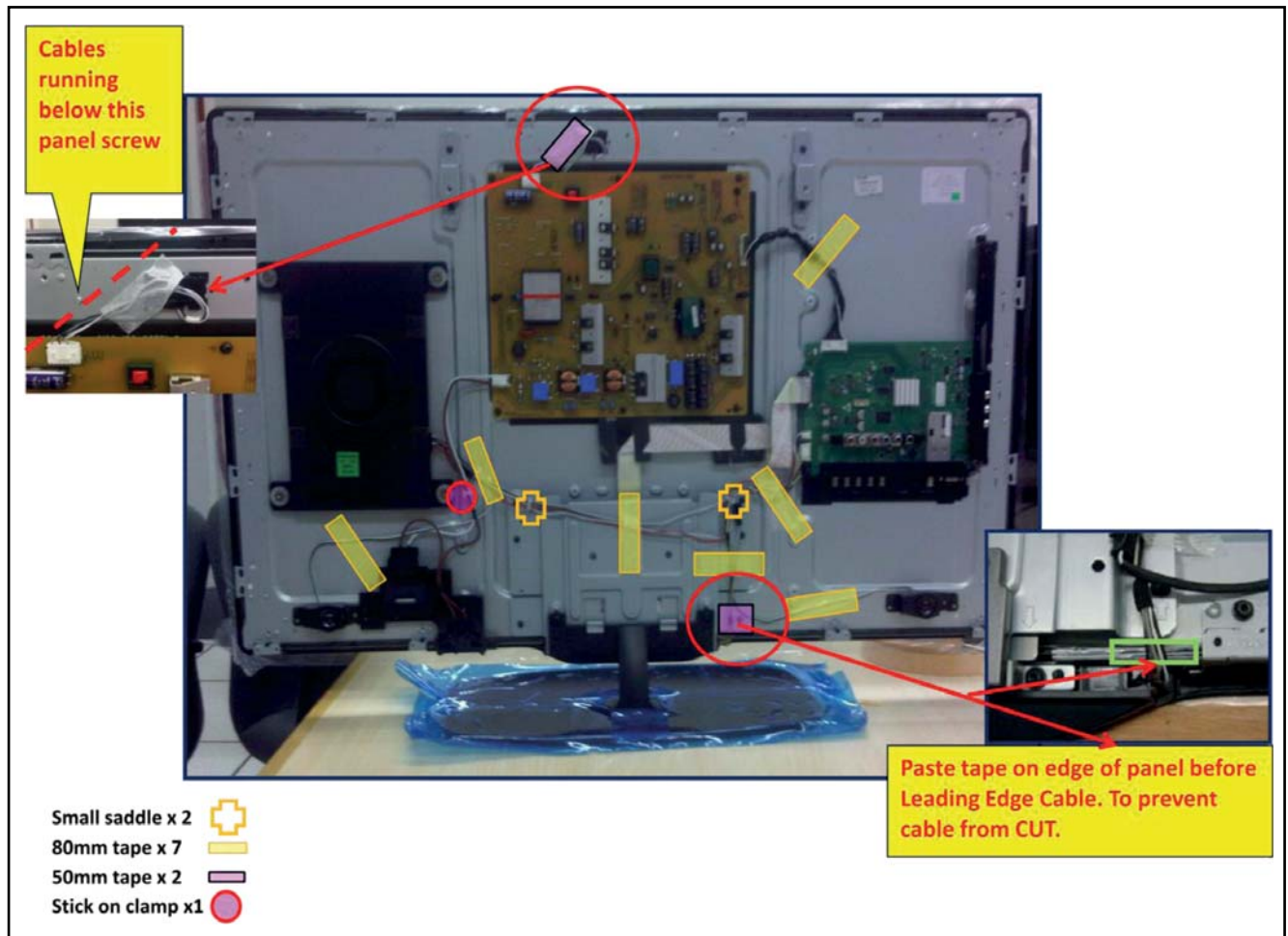
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Figure 4-2 Cable dressing 40" Thriller (xxPFL3x06D/xx)



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110623

Figure 4-3 Cable dressing 32" Berlinale (xxPFL5x06D/xx)



19131_026_110623.eps
110623

Figure 4-4 Cable dressing 40" Berline (xxPFL5x06D/xx)

4.2 Service Positions

For easy servicing of a TV set, the set should be put face down on a soft flat surface, foam buffers or other specific workshop tools. Ensure that a stable situation is created to perform

measurements and alignments. When using foam bars take care that these always support the cabinet and **never** only the display. **Caution:** Failure to follow these guidelines can seriously damage the display! Ensure that ESD safe measures are taken.

4.3 Assy/Panel Removal (Thriller styling; xxPFL3x06D/xx)

Instructions below apply to the 40PFL3606D/78, but will be similar for other models.

4.3.1 Rear Cover



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Figure 4-5 Rear cover removal (40")

Warning: Disconnect the mains power cord before removing the rear cover.

See [Figure 4-5](#).

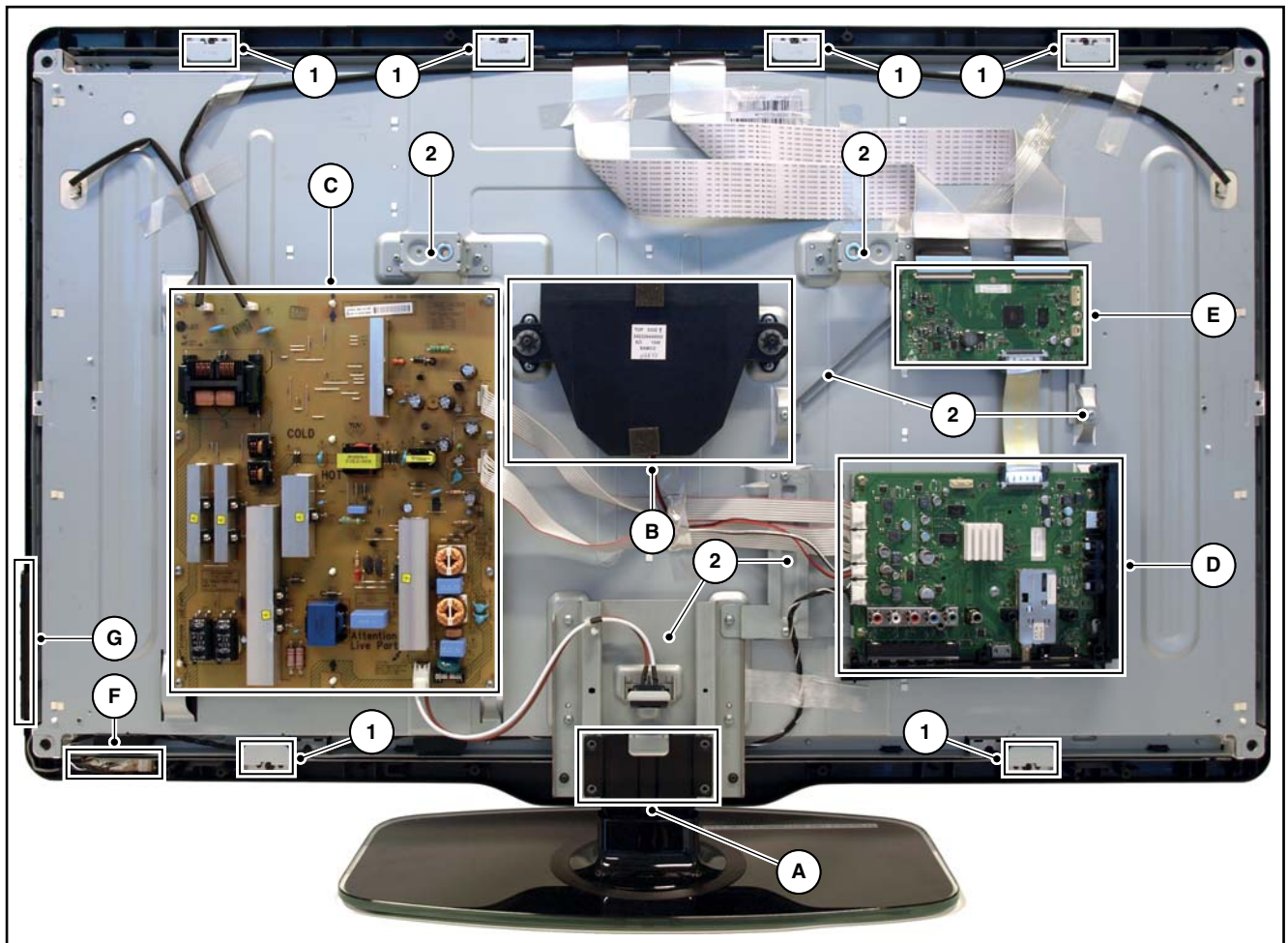
1. Remove fixation screws [2] and [3] that secure the rear cover. It is not necessary to remove the stand first [1].
2. Lift the rear cover from the TV. Make sure that wires and flat foils are not damaged while lifting the rear cover from the set.

4.3.2 LCD Panel

Refer to [Figure 4-6](#) for details.

1. Remove the Stand [A].
2. Remove the Speakers/Subwoofer [B].
3. Remove the PSU [C], SSB [D] and TCON (E).

4. Remove the IR/LED board [F].
5. Remove the Local Control board [G].
6. Remove the clamps [1].
7. Remove all metal subframes [2] that do not belong to the LCD display.



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Figure 4-6 LCD Panel removal (based on 40" model)

4.4 Assy/Panel Removal (Berlinale styling; xxPFL5x06D/xx)

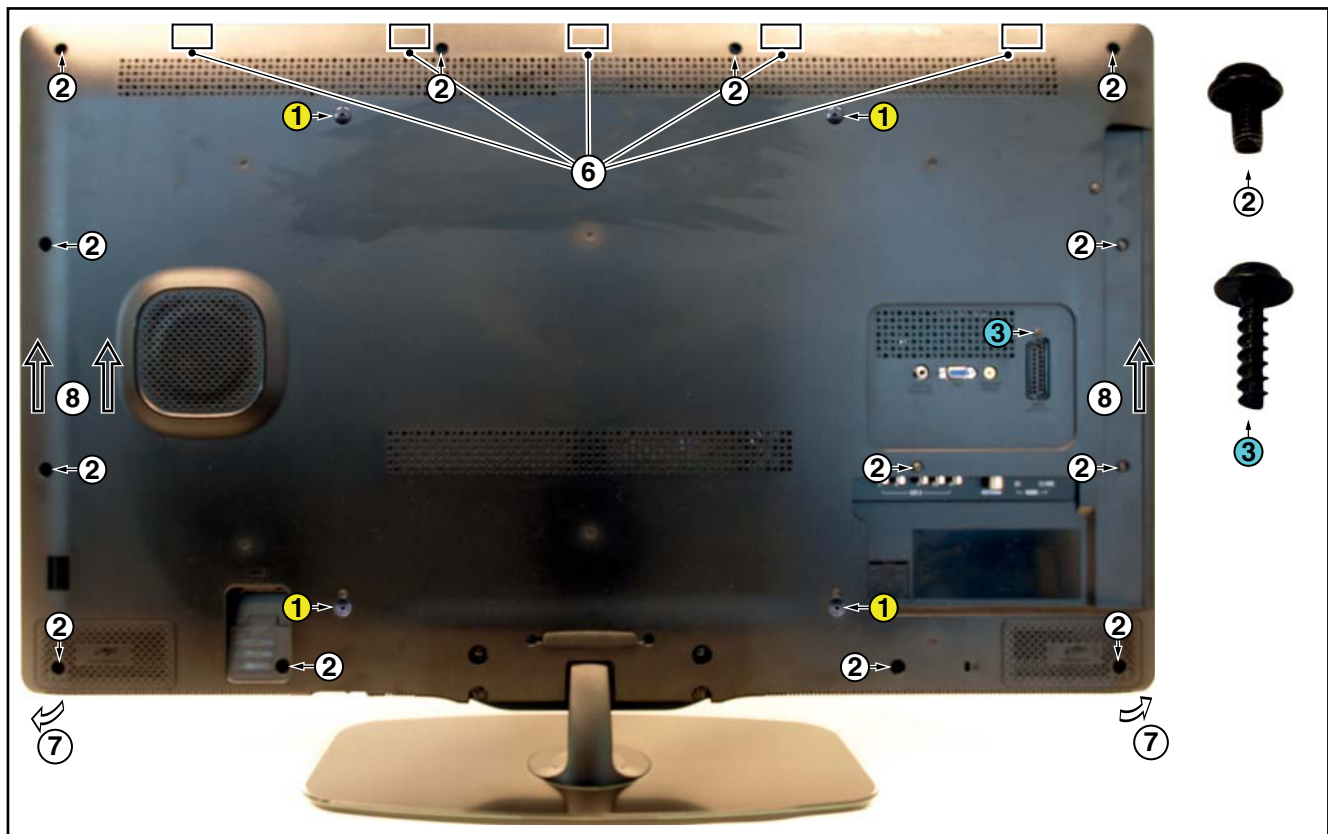
Instructions below apply to the 40PFL5606H/12 (European model), but will be similar for other models.

4.4.1 Rear Cover

Refer to [Figure 4-7](#) to [Figure 4-9](#) for details.

Warning: Disconnect the mains power cord before removing the rear cover.

1. Remove screw caps [1] that cover VESA screw holes.
2. Remove all fixation screws [2], [3] that secure the rear cover.
3. Release the bottom catches [4], [5].
4. At the indicated areas [6] the cover is secured by clips. Be very careful with releasing those.
5. Lift the rear cover from the TV starting from the bottom [7] and tilt it vertically [8]. Make sure that wires and flat foils are not damaged while lifting the rear cover from the set.



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Figure 4-7 Rear cover removal -1-



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110513

Figure 4-8 Rear cover removal -2-



19150_014_110513.eps
110513

Figure 4-9 Rear cover removal -3-

4.4.2 Small Signal Board (SSB)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

1. Release the clips from both the LVDS Flat Foil connectors that connect with the SSB.

Caution: be careful, as these are very fragile connectors! Take the flat foils out of their connectors.

2. Unplug all other connectors.
3. Remove all fixation screws from the SSB. Note that one screw is located below the upper flat foil cable.
4. Take out the SSB together with side and bottom I/O bracket.
5. Remove the screws between the bottom Y-Pb and L-R audio connectors.
6. Remove the side and bottom I/O bracket from the SSB. Note that these parts are kept in place by very fragile clips. Release those clips gently!

4.4.3 Power Supply Unit (PSU)

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the PSU.

1. Release the tape from the Power board cables.
 2. Unplug power connectors from the SSB, as it is not unplugable at the PSU itself (soldered connector).
 3. Unplug both other connectors from the PSU.
 4. Remove all fixation screws from the PSU.
 5. The PSU can be taken out of the set now.
- When defective, replace the whole unit.

4.4.4 Stand removal

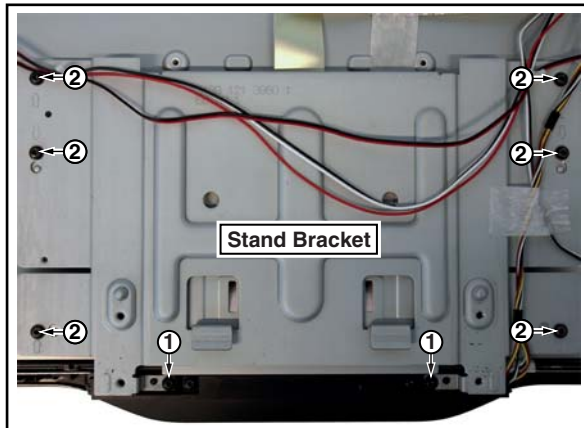
1. Remove the four fixation screws.
2. Take the stand out in a downwards direction.

4.4.5 Stand bracket removal

Refer to [Figure 4-10](#) for details.

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Be sure to put the set in the Service Position.

1. Remove the fixation screws [1].
2. Take the Stand bracket out.



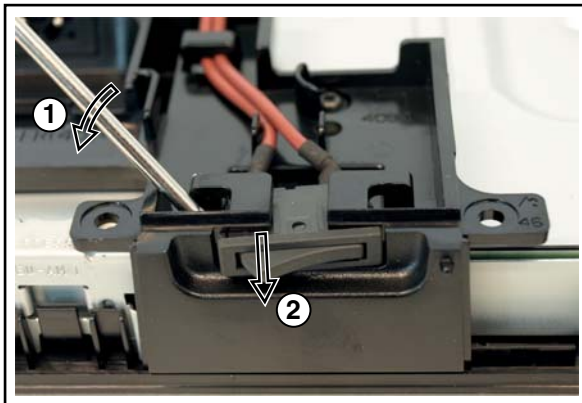
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110512

Figure 4-10 Stand bracket removal

4.4.6 Power switch and mains plug

Refer to [Figure 4-11](#) for details.

1. Unplug the connector from the PSU.
 2. The switch and mains inlet can be removed by lifting the catches with a screwdriver [1] and sliding them out [2].
- When defective, replace the power switch and mains plug assembly.



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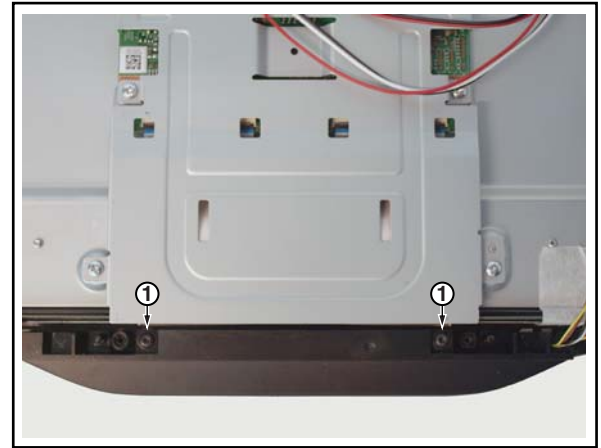
Figure 4-11 Power switch and mains plug removal

4.4.7 IR/LED/Keyboard

Refer to [Figure 4-12](#) for details.

1. Remove the stand bracket as described earlier.
2. Remove the screws [1] that connect the IR/LED/Keyboard to the bezel.

When defective, replace the whole unit.



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Figure 4-12 IR/LED/Keyboard removal

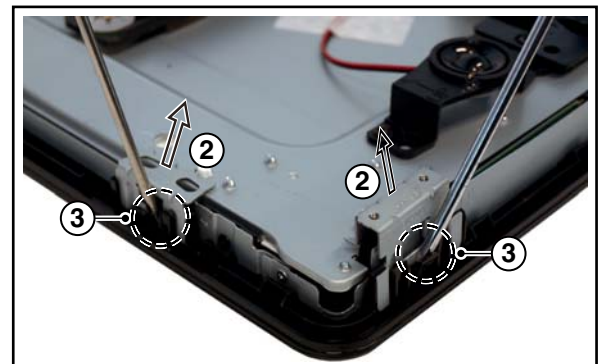
4.4.8 LCD Panel

Refer to [Figure 4-14](#) for details.

1. Remove the SSB as described earlier.
2. Remove the PSU as described earlier.
3. Remove the stand as described earlier.
4. Remove the stand bracket as described earlier.
5. Remove the Power switch and mains plug as described earlier and remove the plastic subframe.
6. Remove the speakers.
7. Remove all tapes that secure any cable and remove the cables from the set.
8. Release the clips from the LVDS flat foil connector [1].

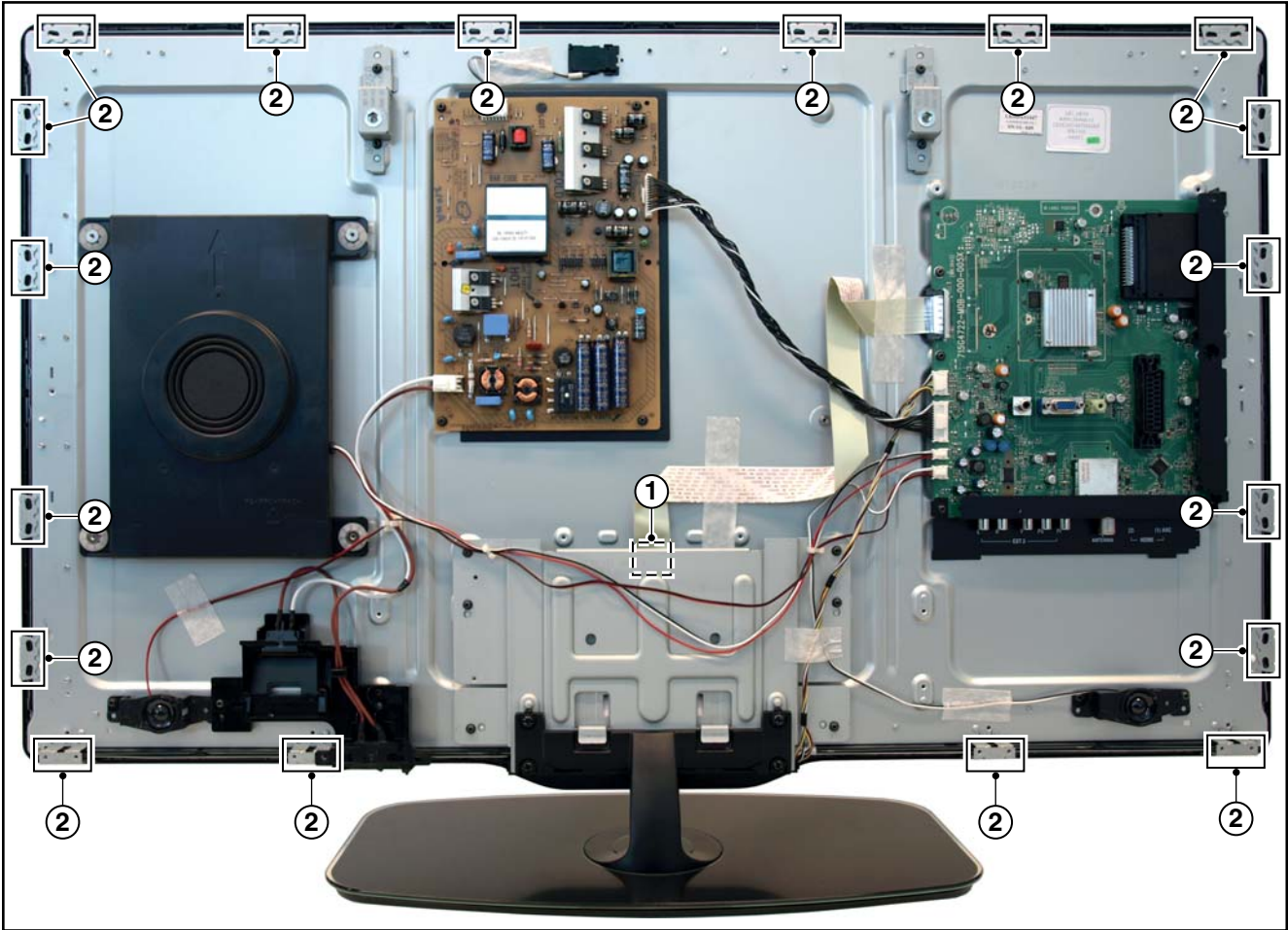
Caution: be careful, as these are very fragile cables and connectors! Take the flat foil out of its connector.

9. Release the metal clips [2] at the top, sides and bottom of the panel that secure the LCD panel with the bezel and remove the clips from their position. Be careful not to break the plastic catches [3] that secure the metal brackets.
 10. Lift the LED Panel from the bezel.
- When defective, replace the whole unit.



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Figure 4-13 LCD Panel removal -1-



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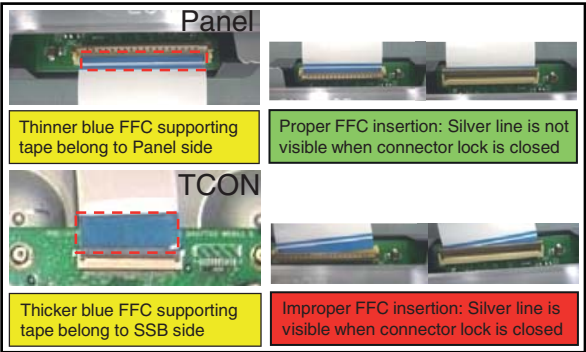
Figure 4-14 LCD Panel removal -2-

4.5 Set Re-assembly

To re-assemble the whole set, execute all processes in reverse order.

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original position. See [Figure 4-15](#)
- Pay special attention not to damage the EMC foams in the set. Ensure that EMC foams are mounted correctly.



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Figure 4-15 Flat Foil Cable (FFC) precautions

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

[5.1 Test Points](#)
[5.2 Service Modes](#)
[5.3 Service Tools](#)
[5.4 Error Codes](#)
[5.5 The Blinking LED Procedure](#)
[5.6 Fault Finding and Repair Tips](#)
[5.7 Repair Policy TCON Boards](#)
[5.8 Software Upgrading](#)

5.1 Test Points

In the chassis schematics and layout overviews, the test points are mentioned. In the schematics and layouts, test points are indicated with “Fxxx” or “Ixxx”.

As most signals are digital, it will be difficult to measure waveforms with a standard oscilloscope. Several key ICs are capable of generating test patterns, which can be controlled via ComPair. In this way it is possible to determine which part is defective.

Perform measurements under the following conditions:

- Service Default Mode.
- Video: Color bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

The Service Mode feature is split into four parts:

- Service Default Mode (SDM).
- Service Alignment Mode (SAM).
- Customer Service Mode (CSM).
- Computer Aided Repair Mode (ComPair).

SDM and SAM offer features, which can be used by the Service engineer to repair/align a TV set. Some features are:

- A pre-defined situation to ensure measurements can be made under uniform conditions (SDM).
- Activates the blinking LED procedure for error identification when no picture is available (SDM).
- The possibility to overrule software protections when SDM is entered via the Service pins.
- Make alignments (e.g. White Tone), (de)select options, enter options codes, reset the error buffer (SAM).
- Display information (“SDM” or “SAM” indication in upper right corner of screen, error buffer, software version, operating hours, options and option codes, sub menus).

The CSM is a Service Mode that can be enabled by the consumer. The CSM displays diagnosis information, which the customer can forward to the dealer or call centre. In CSM mode, “CSM”, is displayed in the top right corner of the screen. The information provided in CSM and the purpose of CSM is to:

- Increase the home repair hit rate.
- Decrease the number of nuisance calls.
- Solved customers' problem without home visit.

ComPair Mode is used for communication between a computer and a TV on I2C /UART level and can be used by a Service engineer to quickly diagnose the TV set by reading out error codes, read and write in NVMs, communicate with ICs and the uP (PWM, registers, etc.), and by making use of a fault finding database. It will also be possible to up and download the software of the TV set via I2C with help of ComPair. To do this, ComPair has to be connected to the TV set via the ComPair connector, which will be accessible through the rear of the set (without removing the rear cover).

5.2.1 General

Next items are applicable to all Service Modes or are general.

Life Timer

During the life time cycle of the TV set, a timer is kept (called “Op. Hour”). It counts the normal operation hours (not the Stand-by hours). The actual value of the timer is displayed in SDM and SAM in a decimal value. Every two soft-resets increase the hour by +1. Stand-by hours are not counted.

Software Identification, Version, and Cluster

The software ID, version, and cluster will be shown in the main menu display of SDM, SAM, and CSM.

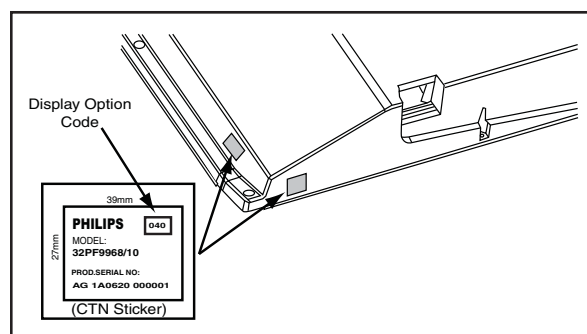
The screen will show: “AAAAAAB-XX.YY”, where:

- **AAAAAA** is the chassis name: L11M11.
- **B** is the region indication: E= Europe, A= AP/China, U= NAFTA, L= LATAM.
- **XX** is the main version number: this is updated with a major change of specification (incompatible with the previous software version). Numbering will go from 01 - 99 and AA - ZZ.
 - If the main version number changes, the new version number is written in the NVM.
 - If the main version number changes, the default settings are loaded.
- **YY** is the sub version number: this is updated with a minor change (backwards compatible with the previous versions) Numbering will go from 00 - 99.
 - If the sub version number changes, the new version number is written in the NVM.
 - If the NVM is fresh, the software identification, version, and cluster will be written to NVM.

Display Option Code Selection

When after an SSB or display exchange, the display option code is not set properly, it will result in a TV with “no display”. Therefore, **it is required** to set this display option code after such a repair.

To do so, press the following key sequence on a standard RC transmitter: “**062598**” directly followed by **MENU/HOME** and “**xxx**”, where “xxx” is a 3 digit decimal value of the panel type, see sticker on the side/bottom of the cabinet. When the value is accepted and stored in NVM, the set will switch to Stand-by, to indicate that the process has been completed.



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Figure 5-1 Location of Display Option Code sticker

During this algorithm, the NVM-content must be filtered, because several items in the NVM are TV-related and not SSB-related (e.g. Model and Prod. S/N). Therefore, “Model” and “Prod. S/N” data is changed into “See Type Plate”. In case a call centre or consumer reads “See Type Plate” in CSM mode, he needs to look to the side/bottom sticker to identify the set, for further actions.

5.2.2 Service Default Mode (SDM)

Purpose

Set the TV in SDM mode in order to be able to create a pre-defined setting for measurements to be made. In this platform, a simplified SDM is introduced (without protection override and without tuning to a predefined frequency).

Specifications

- Set linear video and audio settings to 50%, but volume to 25%. Stored user settings are not affected.
- Set Smart Picture to "Game".
- Set Smart Sound to "Standard".
- Tune channel to:
 - for analogue SDM: channel 3 (61.25 MHz)
 - for digital SDM: channel 26 (545.143 MHz).
- For digital SDM: set PID default from the stream.
- All service-unfriendly modes (if present) are disabled, since they interfere with diagnosing/repairing a set. These service unfriendly modes are:
 - (Sleep) timer.
 - Blue mute/Wall paper.
 - Auto switch "off" (when there is no "ident" signal).
 - Hotel or hospital mode.
 - Child lock or parental lock (manual or via V-chip).
 - Skipping, blanking of "Not favorite", "Skipped" or "Locked" presets/channels.
 - Automatic storing of Personal Preset or Last Status settings.
 - Automatic user menu time-out (menu switches back/OFF automatically).
 - Auto Volume levelling (AVL).

How to Activate

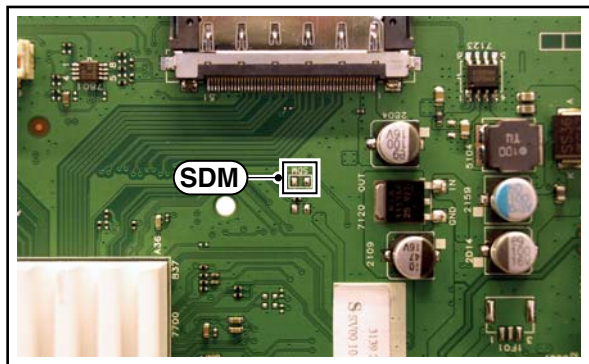
To activate **analogue** SDM, use **one** of the following methods:

- Press the following key sequence on the RC transmitter: "**062596**" directly followed by the **MENU** button.
- Short one of the "Service" pads on the TV board during cold start (see [Figure 5-2](#)). Then press the mains button (remove the short after start-up).

Caution: When doing this, the service-technician must know exactly what he is doing, as it could damage the television set.

To activate **digital** SDM:

- Press the following sequence on the RC transmitter: "**062593**" directly followed by the **MENU** button.



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Figure 5-2 Service pads (SSB component side)

On Screen Menu

After activating SDM, the following items are displayed, with "SDM" in the upper right corner of the screen to indicate that the television is in Service Default Mode.

Menu items and explanation:

- xxxx: Operating hours (in decimal).
- **AAAAAAB-XX.YY**: See paragraph [Software Identification, Version, and Cluster](#) for the SW name definition.

- **ERR**: Shows all errors detected since the last time the buffer was erased in format <xxx> <xxx> <xxx> <xxx> <xxx> (five errors possible).
- **OP**: Used to read-out the option bytes. Ten codes (in two rows) are possible.

How to Navigate

As this mode is read only, there is not much to navigate. To switch to other modes, use one of the following methods:

- Command MENU from the user remote will enter the normal user menu (brightness, contrast, color, etc...) with "SDM" OSD remaining, and pressing MENU key again will return to the last status of SDM again.
- To prevent the OSD from interfering with measurements in SDM, command "OSD" or "i+" ("STATUS" or "INFO" for NAFTA and LATAM) from the user remote will toggle the OSD "on/off" with "SDM" OSD remaining always "on".
- Press the following key sequence on the remote control transmitter: "**062596**" directly followed by the **INFO[i+]/OK** button to switch to SAM (do not allow the display to time out between entries while keying the sequence).

How to Exit

Switch the set to Stand-by by

- pressing the standby button on the remote control transmitter or on the television set, or
 - via a standard RC-transmitter by keying the "00" sequence.
- If you switch the television set "off" by removing the mains (i.e., unplugging the television), the television set will remain in SDM when mains is re-applied, and the error buffer is not cleared. The error buffer will only be cleared when the "clear" command is used in the SAM menu.

Note:

- If the TV is switched "off" by a power interrupt while in SDM, the TV will show up in the last status of SDM menu as soon as the power is supplied again. The error buffer will not be cleared.
- In case the set is accidentally in Factory mode (with an "F" displayed on the screen), pressing and holding "VOL-" button for 5 seconds and then followed by pressing and holding the "CH-" button for another 5 seconds should exit the Factory mode.

5.2.3 Service Alignment Mode (SAM)

Purpose

- To change option settings.
- To display / clear the error code buffer.
- To perform alignments.

Specifications

- Operation hours counter (maximum five digits displayed).
- Software version, error codes, and option settings display.
- Error buffer clearing.
- Option settings.
- Software alignments (White Tone).
- NVM Editor.
- Set screen mode to full screen (all content is visible).
- Set Smart Picture to "Game".

How to Activate

To activate SAM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: "**062596**" directly followed by the **INFO[i+]/OK** button. Do not allow the display to time out between entries while keying the sequence.
- Or via ComPair.

After entering SAM, the following items are displayed, with "SAM" in the upper right corner of the screen to indicate that the television is in Service Alignment Mode.

Menu items and explanation:

1. **System Information.**
 - **Op Hour:** This represents the life timer. The timer counts normal operation hours, but does not count Stand-by hours.
 - **MAIN SW ID:** See paragraph [Software Identification, Version, and Cluster](#) for the SW name definition.
 - **ERR:** Shows all errors detected since the last time the buffer was erased. Five errors possible.
 - **OP1/OP2:** Used to read-out the option bytes. See paragraph [6.7 Option Settings](#) in the Alignments section for a detailed description. Ten codes are possible.
2. **Tuner.**
 - **AGC Adjustment:** See paragraph [6.3.1](#) for instructions.
 - **Store:** To store the data.
3. **Clear.** Erases the contents of the error buffer. Select this menu item and press the MENU RIGHT key on the remote control. The content of the error buffer is cleared.
4. **Options.** To set the option bits. See paragraph [6.7 Option Settings](#) in the “Alignments” chapter for a detailed description.
5. **RGB Align.** To align the White Tone. See [White Tone Alignment:](#) for a detailed description.
6. **NVM Editor.** To change the NVM data in the television set. See also paragraph [5.6 Fault Finding and Repair Tips](#).
7. **Upload to USB.**
8. **Download from USB.**
9. **Initialise NVM.** To initialize a (corrupted) NVM. Be careful, this will erase all settings!
10. **Auto ADC.** Refer to chapter [6. Alignments](#) for detailed information.
11. **EDID Write Enable.** Enables EDID writing (not applicable to Berlinale sets).
12. **Service Data.** Virtual Key board for character input entry.

How to Navigate

- In the SAM menu, select menu items with the UP/DOWN keys on the remote control transmitter. The selected item will be indicated. When not all menu items fit on the screen, use the UP/DOWN keys to display the next / previous menu items.
- With the LEFT/RIGHT keys, it is possible to:
 - Activate the selected menu item.
 - Change the value of the selected menu item.
 - Activate the selected sub menu.
- When you press the MENU button twice while in top level SAM, the set will switch to the normal user menu (with the SAM mode still active in the background). To return to the SAM menu press the MENU button.
- The “INFO[+]/OK” key from the user remote will toggle the OSD “on/off” with “SAM” OSD remaining always “on”.
- Press the following key sequence on the remote control transmitter: “062596” directly followed by the MENU button to switch to SDM (do not allow the display to time out between entries while keying the sequence).

How to Store SAM Settings

To store the settings changed in SAM mode (except the OPTIONS and RGB ALIGN settings), leave the top level SAM menu by using the POWER button on the remote control transmitter or the television set. The mentioned exceptions must be stored separately via the STORE button.

How to Exit

Switch the set to STANDBY by pressing the mains button on the remote control transmitter or the television set, or by keying-in the “00” sequence on a standard RC-transmitter.

Note:

- When the TV is switched “off” by a power interrupt while in SAM, the TV will show up in “normal operation mode” as

soon as the power is supplied again. The error buffer will not be cleared.

- In case the set is in Factory mode by accident (with “F” displayed on screen), pressing and holding “VOL-” button for 5 seconds and then followed by pressing and holding the “CH-” button for another 5 seconds should exit the Factory mode.

5.2.4 Customer Service Mode (CSM)

Purpose

The Customer Service Mode shows error codes and information on the TV’s operation settings. A call centre can instruct the customer (by telephone) to enter CSM in order to identify the status of the set. This helps them to diagnose problems and failures in the TV before making a service call. The CSM is a read-only mode; therefore, modifications are not possible in this mode.

Specifications

- Ignore “Service unfriendly modes”.
- Set volume to 25%.
- Set Smart Picture to “Game”.
- Set Smart Sound to “Standard”.
- Line number for every line (to make CSM language independent).
- Set the screen mode to full screen (all contents on screen is visible).
- After leaving the Customer Service Mode, the original settings are restored.
- Possibility to use “CH+” or “CH-” for channel surfing, or enter the specific channel number on the RC.

How to Activate

To activate CSM, press the following key sequence on a standard remote control transmitter: “123654” (do not allow the display to time out between entries while keying the sequence).

After entering the Customer Service Mode, the following items are displayed:

Menu Explanation CSM1

1. **Set Type.** Type number, e.g. 32PFL3605/78. (*)
2. **Production code.** Product serial no., e.g. BZ1A1008123456 (*). BZ= Production centre, 1= BOM code, A= Service version change code, 10= Production year, 08= Production week, 123456= Serial number.
3. **Installation date.** Indicates the date of the first initialization of the TV. This date is acquired via time extraction.
4. **a - Option Code 1.** Option code information (group 1).
b - Option Code 2. Option code information (group 2).
5. **SSB.** Indication of the SSB factory ID (= 12nc). (*)
6. **Display.** Indication of the display ID (=12 nc). (*)
7. **PSU.** Indication of the PSU factory ID (= 12nc).

(*) If an NVM IC is replaced or initialized, these items must be re-written to it. ComPair will foresee in a possibility to do this. Also the NVM editor in the SAM menu can be used.

Menu Explanation CSM2

1. **Current Main SW.** Shows the main software version.
2. **Standby SW.** Shows the Stand-by software version.
3. **Panel Code.** Shows the current display code.
4. **Bootloader ID.** Shows the Bootloader software ID.
5. **NVM Version.** The NVM software version no.
6. **Flash ID.** Shows the flash ID.

Menu Explanation CSM3

1. **Signal Quality.** Shows the signal quality (No Tuned/Poor/Average/Good).
2. **Child lock.** This is a combined item for locks. If any lock (Preset lock, child lock, lock after, or Parental lock) is active, this item indicates “active”.

3. **HDCP Keys.** Indicates if the HDMI keys (or HDCP keys) are valid or not. Not applicable to Berlinale series.
4. not used
5. not used
6. not used
7. not used.

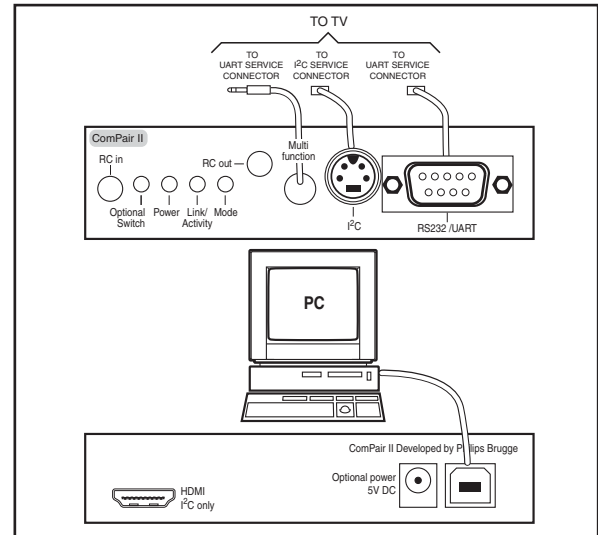
Create a CSM dump on an USB stick

There will be CSM dump to a plugged in USB-stick upon entering CSM-mode. An extended CSM dump will be created when the "OK" button on RC is pressed in CSM while a USB stick is plugged in. A direct CSM flash dump will be created when the buttons "red + 2679" on the remote control are pressed in CSM while a USB stick is plugged in.

How to Exit

To exit CSM, use one of the following methods:

- Press the MENU/HOME button on the remote control transmitter.
- Press the POWER button on the remote control transmitter.
- Press the POWER button on the television set.



10000_036_090121.eps
091118

Figure 5-3 ComPair II interface connection

Caution: It is compulsory to connect the TV to the PC as shown in the picture above (with the ComPair interface in between), as the ComPair interface acts as a level shifter. If one connects the TV directly to the PC (via UART), ICs will be blown!

How to Order

ComPair II order codes:

- ComPair II interface: 3122 785 91020.
- ComPair UART interface cable: 3138 188 75051.
- Program software can be downloaded from the Philips Service web portal.

Note: For this chassis, "Pgammar" and "T-con NVM" programming (VCOM alignment) are added to ComPair.

Additional cables for VCOM Alignment

- ComPair/I²C interface cable: 3122 785 90004.
- ComPair/VGA adapter cable: 9965 100 09269.

5.4 Error Codes

5.4.1 Introduction

Error codes are required to indicate failures in the TV set. In principle a unique error code is available for every:

- Activated (SW) protection.
- Failing I²C device.
- General I²C error.

The last five errors, stored in the NVM, are shown in the Service menu's. This is called the error buffer.

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is displayed at the left side and all other errors shift one position to the right.

An error will be added to the buffer if this error differs from any error in the buffer. The last found error is displayed on the left. An error with a designated error code **never** leads to a deadlock situation. It must always be diagnosable (e.g. error buffer via OSD or blinking LED or via ComPair).

In case a failure identified by an error code automatically results in other error codes (cause and effect), only the error code of the MAIN failure is displayed.

5.4.2 How to Read the Error Buffer

You can read the error buffer in three ways:

- On screen via the SAM/SDM/CSM (if you have a picture).
Example:
 - ERROR: 0 0 0 0 0** : No errors detected
 - ERROR: 6 0 0 0 0** : Error code 6 is the last and only detected error
 - ERROR: 9 6 0 0 0** : Error code 6 was detected first and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See paragraph [5.5 The Blinking LED Procedure](#).
- Via ComPair.

5.4.3 Error codes

The "layer 1" error codes are pointing to the defective board. They are triggered by LED blinking when CSM is activated. In the LC10 platform, only two boards are present: the SSB and the PSU/IPB, meaning only the following layer 1 errors are defined:

- 2: SSB
- 3: IPB/PSU
- 4: Display

Table 5-1 Error code table

Layer-1 error code	Defective board	Layer-2 error code	Defective device
2	SSB	11	Speaker DC protection active on SSB
3	IPB/PSU	16	+12 missing/low, PSU defective
3	IPB/PSU	17	POK line defective
2	SSB	35	EEPROM I2C error on SSB, M24C16
2	SSB	34	Tuner I2C error on SSB
2	SSB	23	HDMI Mux IC I2C error on SSB - Berlinale models with Mux only
2	SSB	27	Channel decoder on SSB
4	Display (Inverter)	18	LCD Panel inverter error. INV_STATUS (for 32" sets only)

5.4.4 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:

- By using the CLEAR command in the SAM menu:
- By using the following key sequence on the remote control transmitter: **"062599"** directly followed by the **OK** button.
- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

Note: If you exit SAM by disconnecting the mains from the television set, the error buffer is not reset.

5.5 The Blinking LED Procedure

5.5.1 Introduction

The software is capable of identifying different kinds of errors. Because it is possible that more than one error can occur over time, an error buffer is available, which is capable of storing the last five errors that occurred. This is useful if the OSD is not working properly.

Errors can also be displayed by the blinking LED procedure. The method is to repeatedly let the front LED pulse with as many pulses as the error code number, followed by a period of 1.5 seconds in which the LED is "off". Then this sequence is repeated.

Example (1): error code 4 will result in four times the sequence LED "on" for 0.25 seconds / LED "off" for 0.25 seconds. After this sequence, the LED will be "off" for 1.5 seconds. Any RC command terminates the sequence. Error code LED blinking is in red color.

Example (2): the content of the error buffer is **"12 9 6 0 0"**

After entering SDM, the following occurs:

- 1 long blink of 5 seconds to start the sequence,
- 12 short blinks followed by a pause of 1.5 seconds,
- 9 short blinks followed by a pause of 1.5 seconds,
- 6 short blinks followed by a pause of 1.5 seconds,
- 1 long blink of 1.5 seconds to finish the sequence,
- The sequence starts again with 12 short blinks.

5.5.2 Displaying the Entire Error Buffer

Additionally, the entire error buffer is displayed when Service Mode "SDM" is entered.

5.6 Fault Finding and Repair Tips

Notes:

- It is assumed that the components are mounted correctly with correct values and no bad solder joints.
- Before** any fault finding actions, check if the correct options are set.

5.6.1 NVM Editor

In some cases, it can be convenient if one directly can change the NVM contents. This can be done with the "NVM Editor" in SAM mode. With this option, single bytes can be changed.

Caution:

- Do not change these, without understanding the function of each setting, because incorrect NVM settings may seriously hamper the correct functioning of the TV set!**
- Always write down the existing NVM settings, before changing the settings. This will enable you to return to the original settings, if the new settings turn out to be incorrect.

5.6.2 Load Default NVM Values

It is possible to download default values automatically into the NVM in case a blank NVM is placed or when the NVM first 20 address contents are "FF". After the default values are downloaded, it is possible to start-up and to start aligning the TV set. To initiate a forced default download the following action has to be performed:

- Switch "off" the TV set with the mains cord disconnected from the wall outlet (it does not matter if this is from "Stand-by" or "Off" situation).
- Short-circuit the SDM pads on the SSB (keep short circuited, see [Figure 5-2](#)).
- Press "P+" or "CH+" on the local keyboard (and keep it pressed).
- Reconnect the mains supply to the wall outlet.
- Release the "P+" or "CH+" when the set is started up and has entered SDM.

When the downloading has completed successfully, the set will perform a restart. After this, put the set to Stand-by and remove the short-circuit on the SDM pads.

Alternative method:

It is also possible to upload the default values to the NVM with ComPair in case the SW is changed, the NVM is replaced with a new (empty) one, or when the NVM content is corrupted. After replacing an EEPROM (or with a defective/no EEPROM), default settings should be used to enable the set to start-up and allow the Service Default Mode and Service Alignment Mode to be accessed.

5.6.3 No Picture

When you have no picture, first make sure you have entered the correct display code.
See [Display Option Code Selection](#) for the instructions.

5.6.4 Unstable Picture via HDMI input

Check (via ComPair) if HDMI EDID data is properly programmed.

5.6.5 No Picture via HDMI input

Check if HDCP key is valid. This can be done in CSM.

5.6.6 HDMI CEC Not Functioning

Go to Home/Menu -> Setup -> Installation -> Preference and set the Easylink option to "on". Also check if the connected device is CEC enabled.

5.6.7 TV Will Not Start-up from Stand-by.

Possible Stand-by Controller failure. Reflash the SW.

5.7 Repair Policy TCON Boards

Thriller sets (xxPFL3x06D/xx) in the 40" range have an additional "Philips" TCON board (diagram T01). This board should be swapped separately from the bare LCD panel. Alignment can be done using ComPair. All other TCON boards come with the LCD panel and should be swapped together as one entity.

5.8 Software Upgrading

5.8.1 Introduction

It is possible for the user to upgrade the main software via the USB port. This allows replacement of a software image in a stand alone set. A description on how to upgrade the main software can be found in the DFU or on the Philips website.

5.8.2 Main Software Upgrade

Automatic Software Upgrade

In "normal" conditions, so when there is no major problem with the TV, the main software and the default software upgrade application can be upgraded with the "autorun.upg" (FUS part in the one-zip file). This can also be done by the consumers themselves, but they will have to get their software from the commercial Philips website or via the Software Update Assistant in the user menu (see DFU). The "autorun.upg" file must be placed in the root of your USB stick.

How to upgrade:

1. Copy the "autorun.upg" file to the root of an USB stick.
2. Insert the USB stick in the side I/O while the set is "on".
The TV will prompt an upgrade message. Press "Update" to continue, after which the upgrading process will start. As soon as the programming is finished, the set must be restarted.

In the "Setup" menu you can check if the latest software is running.

5.8.3 How to Copy NVM Data to/from USB

Write NVM Data to USB

1. Insert the USB stick into the USB slot while in SAM mode.

2. Execute the command "NVM Copy" > "NVM Copy to USB", to copy the NVM data to the USB stick. The NVM filename on the USB stick will be named "L11M11L_NVM_T2U.BIN" (this takes a couple of seconds).

Write NVM Data to TV

1. First, ensure (via a PC) that the filename on the USB stick has the correct format: "L11M11L_NVM_U2T.BIN".
2. Insert the USB stick into the USB slot while in SAM mode.
3. Execute the command "NVM Copy" > "NVM Copy from USB" to copy the USB data to NVM (this takes about a minute to complete).

To write an NVM mask to the TV, ensure that the mask has the correct format: "L11M11L_NVM_U2T.MAK" (0x00 to write protect, 0xFF to overwrite).

Important: The file must be located in the "/Repair" directory of the USB stick.

5.8.4 How to Copy EDID Data to/from USB

Write EDID Data to USB

1. Insert the USB stick into the USB slot while in SAM mode.
2. Execute the command "NVM Copy" > "EDID Copy to USB", to copy the EDID data to the USB stick. The filename on the USB stick will be named "L11M11L_EDID_T2U.BIN" (this takes a couple of seconds).

Write EDID Data to TV

1. First, ensure (via a PC) that the filename on the USB stick has the correct format: "L11M11L_EDID_U2T.BIN".
2. Insert the USB stick into the USB slot while in SAM mode.
3. Execute the command "NVM Copy" > "EDID Copy from USB" to copy the USB data to EDID (this takes about a minute to complete).

Important: The file must be located in the "/Repair" directory of the USB stick.

5.8.5 How to Copy the Channel List to/from USB

Write Channel List Data to USB

1. Insert the USB stick into the USB slot while in SAM mode.
2. Execute the command "Channel list Copy to USB", to copy the channel list data to the USB stick. The filename on the USB stick will be named "L11M11L_CHTB_T2U.BIN" (this takes a couple of seconds).

Write Channel List Data to TV

1. First, ensure (via a PC) that the filename on the USB stick has the correct format: "L11M11L_CHTB_U2T.BIN".
2. Insert the USB stick into the USB slot while in SAM mode.
3. Execute the command "Channel list Copy from USB" to copy the USB data to the TV (this takes about a minute to complete).

Important: The file must be located in the "/Repair" directory of the USB stick.

6. Alignments

Index of this chapter:

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[6.2 Hardware Alignments](#)
[6.3 Software Alignments](#)
[6.4 ADC gain adjustment](#)
[6.5 TCON Alignment \(= VCOM alignment\)](#)
[6.6 Additional TCON Board](#)
[6.7 Option Settings](#)

Note: Figures below can deviate slightly from the actual situation, due to the different set executions.

General: The Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5. Menu navigation is done with the CURSOR UP, DOWN, LEFT or RIGHT keys of the remote control transmitter.

6.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Power supply voltage (depends on region):
 - AP-NTSC: 120 V_{AC} or 230 V_{AC} / 50 Hz (± 10%).
 - AP-PAL-multi: 120 - 230 V_{AC} / 50 Hz (± 10%).
 - EU: 230 V_{AC} / 50 Hz (± 10%).
 - LATAM-NTSC: 120 - 230 V_{AC} / 50 Hz (± 10%).
 - US: 120 V_{AC} / 60 Hz (± 10%).
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 15 minutes.
- Measure voltages and waveforms in relation to correct ground (e.g. measure audio signals in relation to AUDIO_GND).
- Caution:** It is not allowed to use heatsinks as ground.
- Test probe: R_i > 10 Mohm, C_i < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

6.2 Hardware Alignments

There are no hardware alignments foreseen for this chassis, but below find an overview of the most important DC voltages on the SSB. These can be used for checking proper functioning of the DC/DC converters.

Description	Test Point	Specifications (V)			Diagram
		Min.	Typ.	Max.	
+12VS	F118	11.7	12.3	12.91	B01_DC-DC
+3V3_STBY	F113	3.2	3.3	3.4	B01_DC-DC
+3V3_SW	F133	3.17	3.34	3.5	B01_DC-DC
+1V25_SW	F131	1.18	1.25	1.31	B01_DC-DC
+5V_SW	F132	4.98	5.25	5.51	B01_DC-DC
+1V8_SW	F125	1.74	1.83	1.92	B01_DC-DC
+1V1_SW	F101	0.94	1.1	1.15	B01_DC-DC
+5VS	F235	4.94	5.2	5.46	B02A_Tuner_IF
+2V5_SW	F136	2.38	2.5	2.62	B01_DC-DC
+5VTUN_DI GITAL	F236	4.75	5	5.25	B02_Tuner_IF
VLS_15V6	FJ01	14.82	15.6	16.38	B08C_TCON DC/DC
VGH_35V	FM02	34.0	35.0	36.0	B08F_MINI LVDS
VGL_-6V	FJ14	-7.0	-6.0	-5.0	B08C_TCON DC/DC
VCC_3V3	FJ13	3.14	3.3	3.47	B08C_TCON DC/DC
VCC1V8	FJ05	1.71	1.8	1.89	B08C_TCON DC/DC

6.3 Software Alignments

With the software alignments of the Service Alignment Mode (SAM) the Tuner and RGB settings can be aligned.

6.3.1 Tuner Adjustment (RF AGC Take Over Point)

Purpose: To keep the tuner output signal constant as the input signal amplitude varies.

No alignment is necessary, as the AGC alignment is done automatically.

6.3.2 RGB Alignment

Before alignment, set the picture as follows:

Picture Setting	
Dynamic backlight	Off
Dynamic Contrast	Off
Color Enhancement	Off
Picture Format	Unscaled
Light Sensor	Off
Brightness	50
Color	0
Contrast	100

White Tone Alignment:

- Activate SAM.
- Select "RGB Align." and choose a color temperature.
- Use a 100% white screen as input signal and set the following values:
 - "Red BL Offset" and "Green BL Offset" to "7" (if present).
 - All "White point" values initial to "127".

In case you have a color analyzer:

- Measure with a calibrated (phosphor- independent) color analyzer (e.g. Minolta CA-210) in the centre of the screen. Consequently, the measurement needs to be done in a dark environment.
- Adjust the correct x,y coordinates (while holding one of the White point registers R, G or B on max. value) by means of decreasing the value of one or two other white points to the correct x,y coordinates (see Table 6-1 White D alignment values). Tolerance: dx: ± 0.002, dy: ± 0.002.
- Repeat this step for the other color Temperatures that need to be aligned.
- When finished return to the SAM root menu and press STANDBY on the RC to store the aligned values to the NVM.

Table 6-1 White D alignment values

Value	Cool (11000 K)	Normal (9000 K)	Warm (6500 K)
x	0.276	0.287	0.313
y	0.282	0.296	0.329

If you do **not** have a color analyzer, you can use the default values. This is the next best solution. The default values are average values coming from production (statistics).

- Set the RED, GREEN and BLUE default values per temperature according to the values in the "Tint settings" table.
- When finished return to the SAM root menu and press STANDBY on the RC to store the aligned values to the NVM.

Table 6-2 Tint settings 32" Thriller HD (xxPFL3406D/xx)

Colour Temp.	R	G	B
Cool	201	240	255
Normal	227	255	243
Warm	243	249	164

Table 6-3 Tint settings 32" Thriller FHD (xxPFL3606D/xx)

Colour Temp.	R	G	B
Cool	246	246	248
Normal	242	240	246
Warm	255	231	155

Table 6-4 Tint settings 40" Thriller FHD (xxPFL3606D/xx)

Colour Temp.	R	G	B
Cool	212	244	254
Normal	231	255	236
Warm	242	252	161

Table 6-5 Tint settings 32" Berlinale FHD (xxPFL5606D/xx)

Colour Temp.	R	G	B
Cool	187	255	241
Normal	211	254	217
Warm	234	254	156

Table 6-6 Tint settings 40" Berlinale FHD (xxPFL5606D/xx)

Colour Temp.	R	G	B
Cool	t.b.d.	t.b.d.	t.b.d.
Normal	t.b.d.	t.b.d.	t.b.d.
Warm	t.b.d.	t.b.d.	t.b.d.

6.4 ADC gain adjustment

Use a Quantum Data Patters Generator 802BT and apply a "PgcWrgb" image ("dot, cross and color bar mix pattern") according to [Figure 6-1](#).

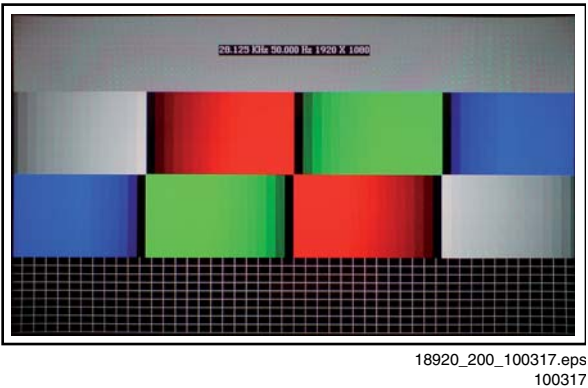


Figure 6-1 "PgcWrgb" pattern

6.4.1 YPbPr

Following instructions result in correct alignment of ADC gain, offset and phase, related to YPbPr input signal. Apply a signal of format "1080i25".

- Apply following signals to the YPbPr input connectors:
 - Pr signal of 0.7 Vp-p¹ / 75 ohm to the red cinch connector.
 - Y signal of 0.7 Vb-p² / 75 ohm with a sync pulse of 0.3 Vp-p¹ to the green cinch connector.
 - Pb signal of 0.7 Vb-p¹ / 75 ohm to the blue cinch connector.

- Select the input source to YPbPr input.
- In SAM, initiate the "Auto ADC" calibration command. Upon appearance of the "Auto ADC Completed" message, the alignment is completed.

- Notes:**
- Peak-to-Peak
 - Black-to-Peak.

6.4.2 PC VGA

Following instructions result in correct alignment of ADC gain, offset and phase, related to PC VGA input signal. Apply a signal of format "DMT1060".

- Apply following signals to the PC VGA input connector:
 - Red signal of 0.7 Vp-p¹ / 75 ohm.
 - Green signal of 0.7 Vp-p¹ / 75 ohm.
 - Blue signal of 0.7 Vp-p¹ / 75 ohm.
- Select the input source to PC VGA input.
- In SAM, initiate the "Auto ADC" calibration command. Upon appearance of the "Auto ADC Completed" message, the alignment is completed.

6.5 TCON Alignment (= VCOM alignment)

New requirement for "TCON on SSB" project:

- The purpose of VCOM alignment is to obtain an equal voltages for both Positive and Negative LC polarity. This is important to avoid "Flicker" and "Image Sticking".
- The P-Gamma + VCOM calibrator IC, ISL24837 is used for VCOM adjustment.
- The adjusted VCOM data will be stored inside on-chip memory and will be automatically recalled during each power-up.

ComPair (see [5.3.1 ComPair](#)) will foresee in a possibility to do this alignment.

6.6 Additional TCON Board

Thriller sets (xxPFL3x06D/xx) in the 40" range have an additional "Philips" TCON board (diagram T01). This board should be swapped separately from the bare LCD panel. Alignment can be done using ComPair. All other TCON boards come with the LCD panel and should be swapped together as one entity.

6.7 Option Settings

6.7.1 Introduction

The microprocessor communicates with a large number of I²C ICs in the set. To ensure good communication and to make digital diagnosis possible, the microprocessor has to know which ICs to address. The presence/absence of these specific ICs (or functions) is made known by the option codes.

- Notes:**
- After changing the option(s), save them with the STORE command.
 - The new option setting becomes active after the TV is switched "off" and "on" again with the mains switch (the EAROM is then read again).

6.7.2 How To Set Option Codes

When the NVM is replaced, all options will require resetting. To be certain that the factory settings are reproduced exactly, you must set all option numbers. You can find the correct option numbers see sticker on the inside the cabinet.

How to Change Options Codes

An option code (or “option byte”) represents eight different options (bits). All options are controlled via ten option bytes (OP#1... OP#10).

Activate SAM and select “Options”. Now you can select the option byte (OP#1... OP#10) with the CURSOR UP/ DOWN keys, and enter the new 3 digit (decimal) value. For the correct factory default settings, see the sticker inside the set.

7. Circuit Descriptions

Index of this chapter:

- [7.1 Introduction](#)
- [7.2 Power Supply](#)
- [7.3 Video](#)
- [7.3.1 Video: Front-End](#)
- [7.4 Audio](#)
- [7.5 Inputs](#)
- [7.5.1 Inputs: HDMI](#)
- [7.5.2 Inputs: USB](#)

Notes:

- Only **new** circuits (circuits that are not published recently) are described.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use chapter [9. Block Diagrams](#) and [10. Circuit Diagrams and PWB Layouts](#). Where necessary, you will find a separate drawing for clarification.

7.1 Introduction

The LC11M1.1L LA chassis is a digital chassis using a Mediatek chipset. It covers screen sizes of 32" to 40".

The xxPFL3x06D/xx sets come with the "Thriller" styling, and the xxPFL5x06D/xx come with the "Berlinale" styling.

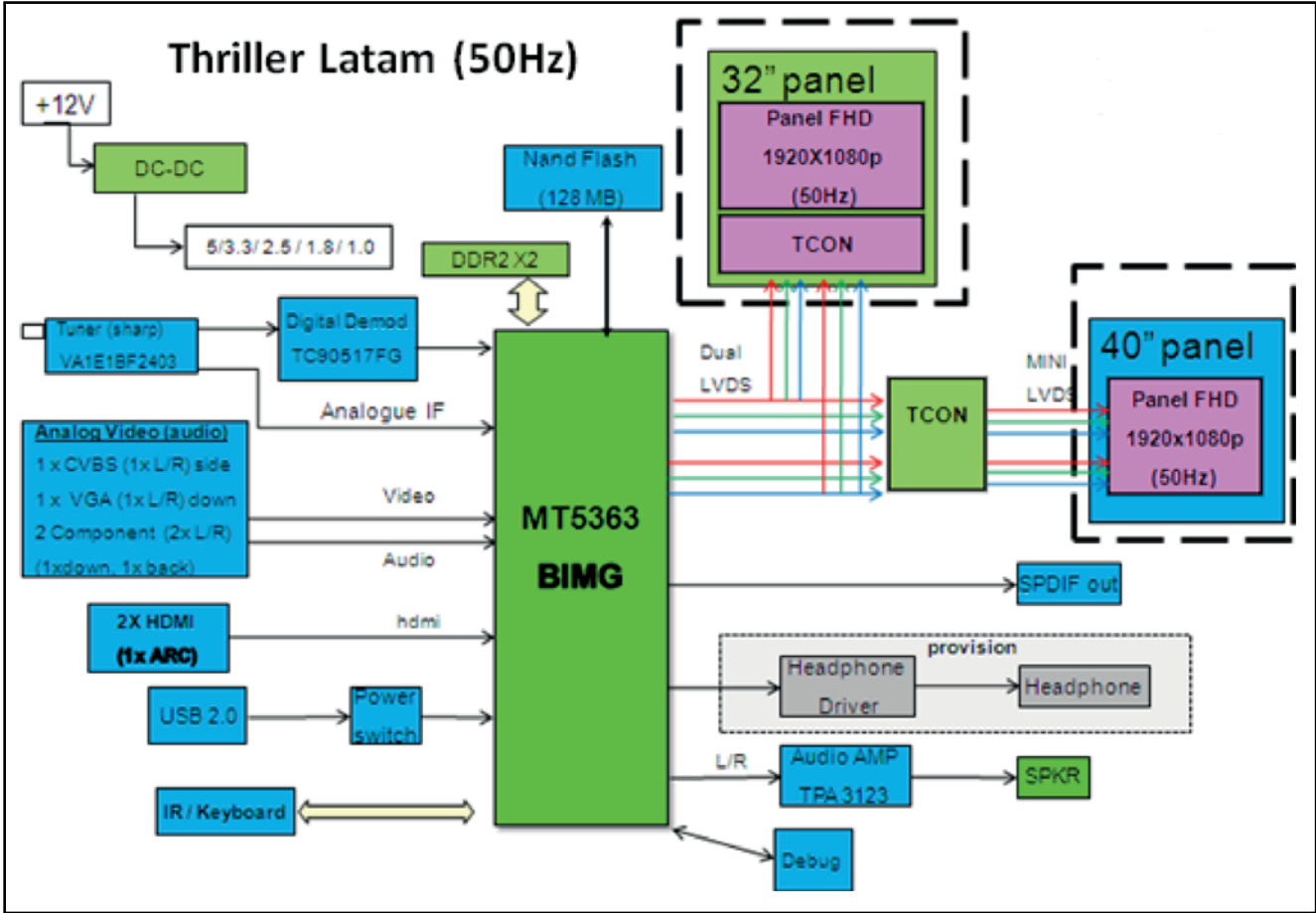
Main key components are the Mediatek MT5363 integrated "System On Chip" (SoC) that supports multimedia video/audio input, and the integrated TCON (Timing Controller), part for the LCD panel. Thriller sets (xxPFL3x06D/xx) in the 40" range however have an additional "Philips" TCON board (diagram T01) that comes separate from the LCD panel and that should be swapped separately.

- System SoC is based on MT5363:
- NAND Flash – 128 Mbyte, NumOnyx/Hynix.
 - DDR – 128 Mbyte (32 × 16M, 2 pcs), Hynix.
 - Use internal MT5363 Stand-by micro-controller.

- Tuner/Frontend configuration:
- Half NIM tuner (VA1E1BF2403) from Sharp.
 - Toshiba Channel Decoder (TC90517).

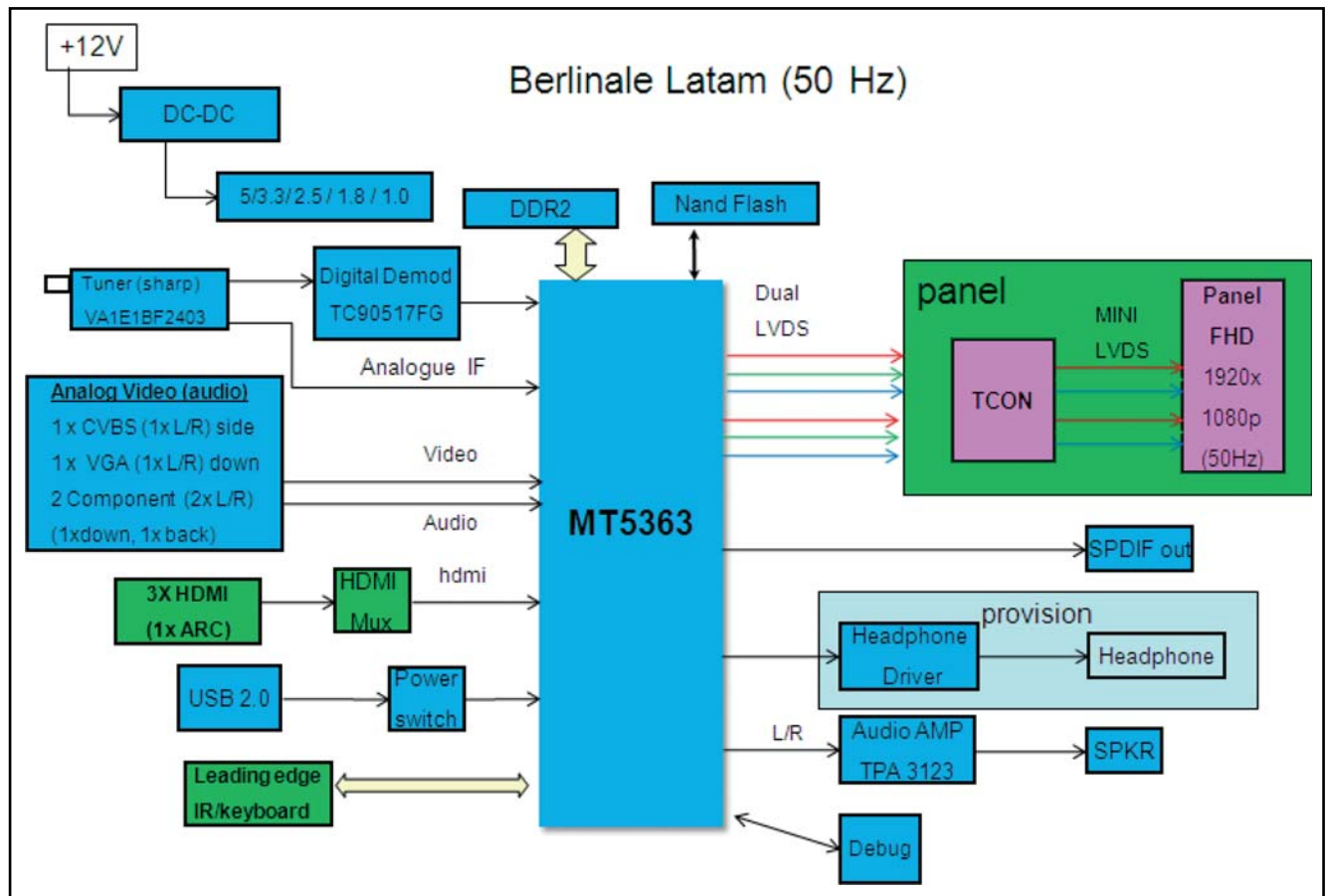
- Interfaces for debug and SW upgrade:
- UART (3.5 mm jack).
 - USB port.
 - JTAG.

Refer to [Figure 7-1](#) for details.



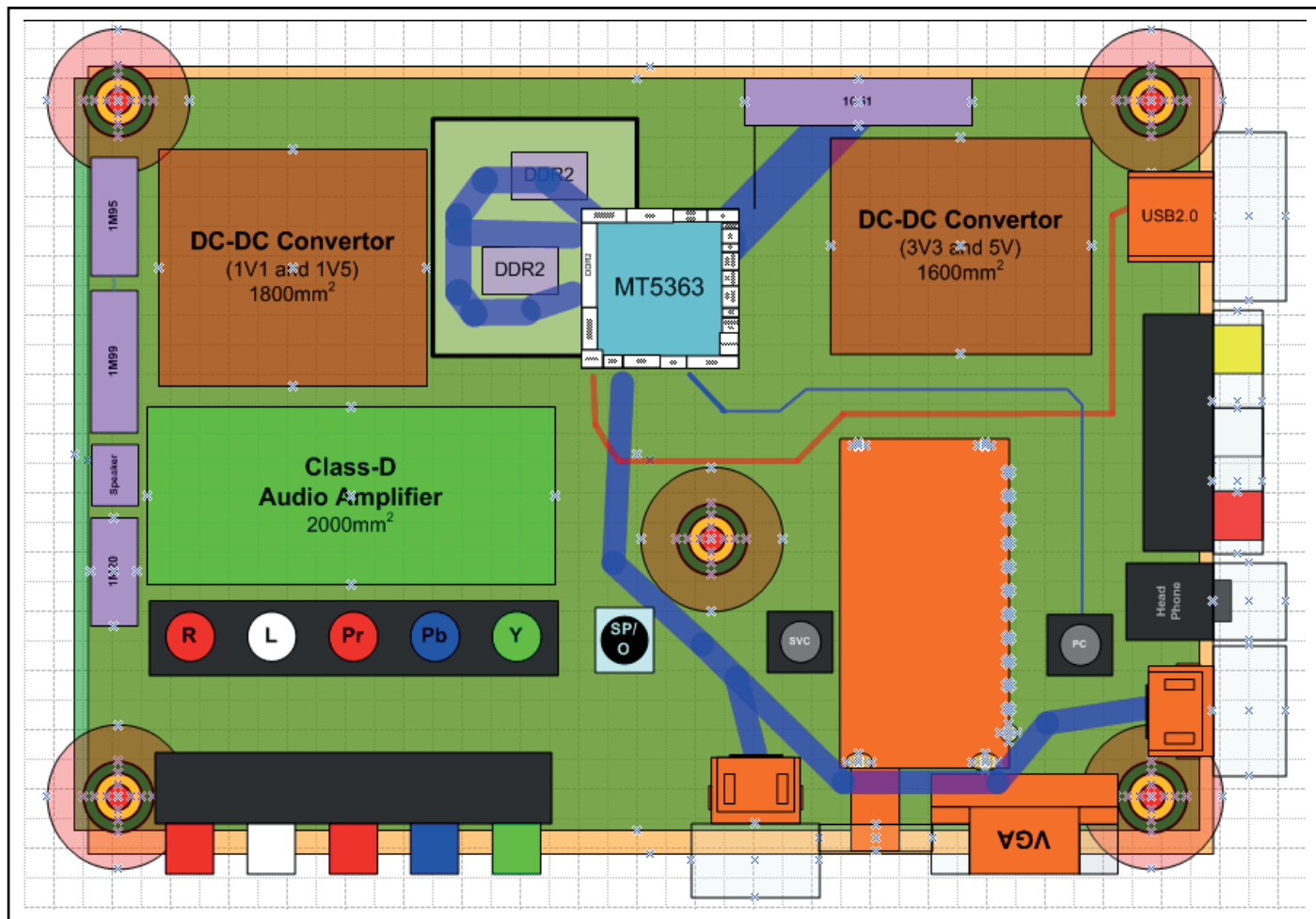
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Figure 7-1 L11M1.1L LA Architecture Thriller (xxPFL3x06D/xx)



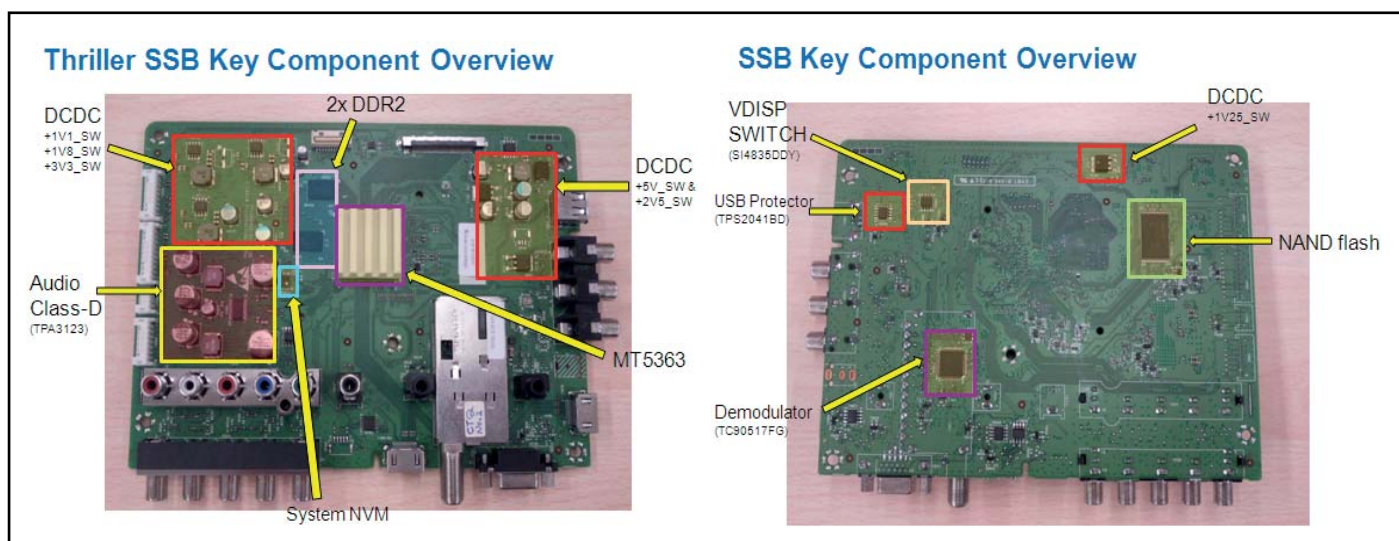
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110623

Figure 7-2 L11M1.1L LA Architecture Berlinale (xxPFL5x06D/xx)



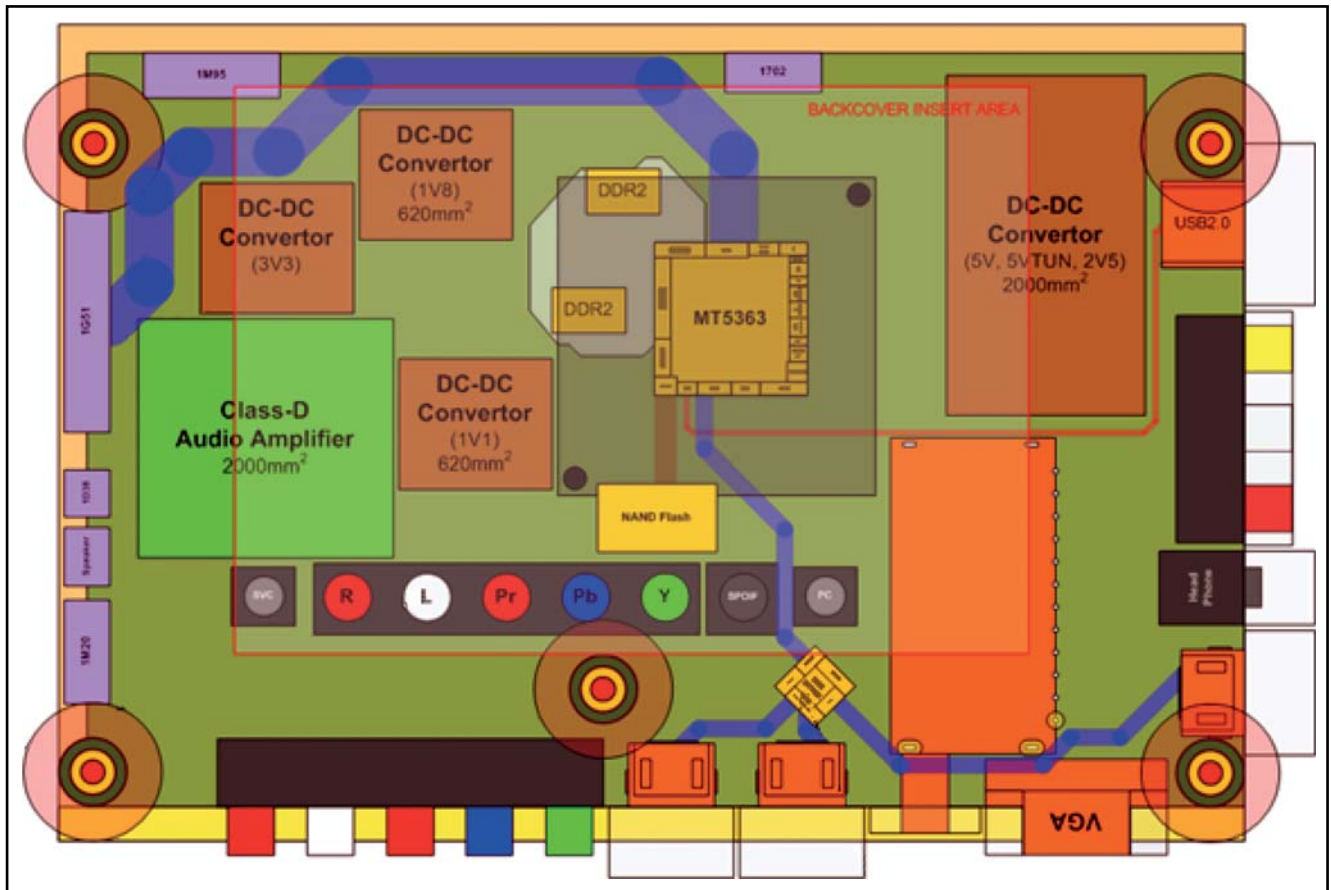
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Figure 7-3 SSB cell layout Thriller (xxPFL3x06D/xx)



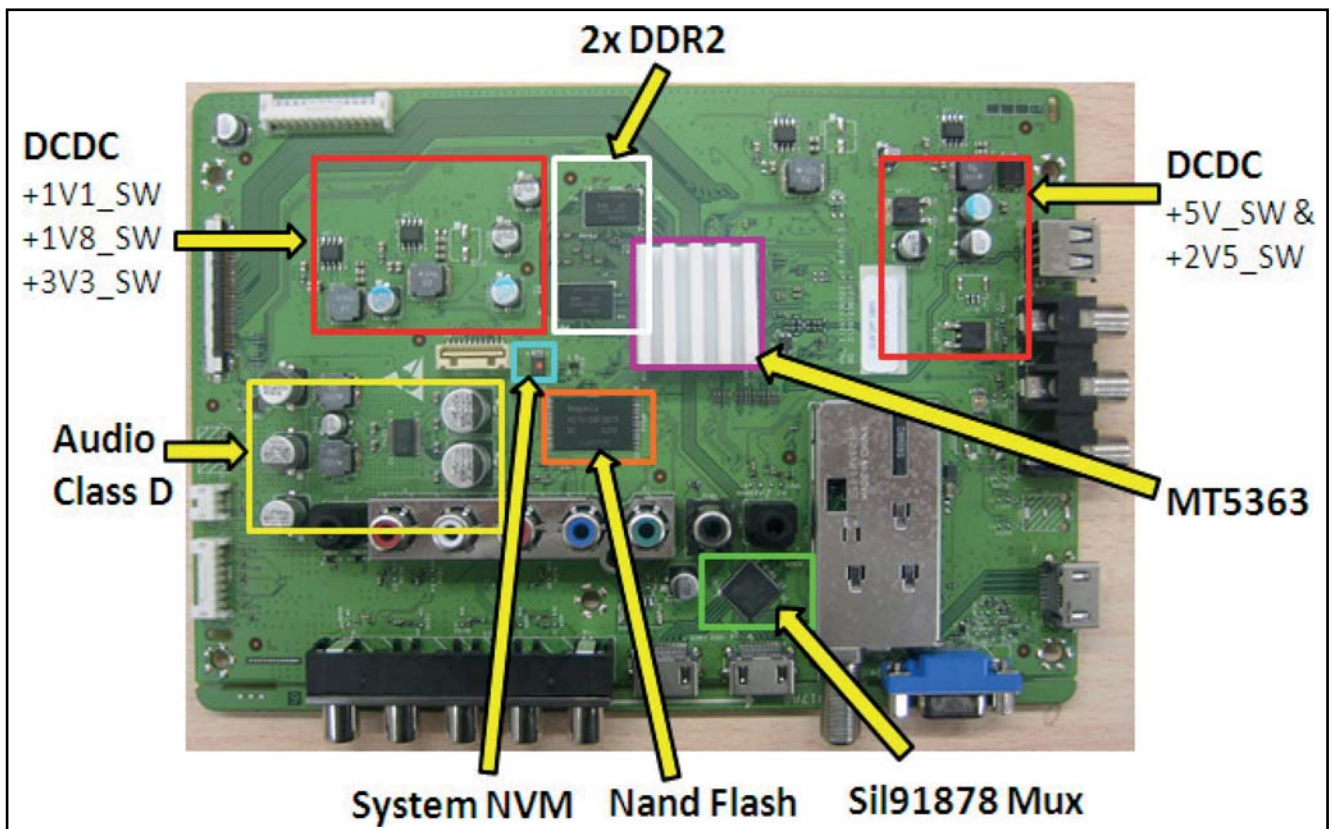
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Figure 7-4 SSB key component overview Thriller (xxPFL3x06D/xx)



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110623

Figure 7-5 SSB cell layout Berlineale (xxPFL5x06D/xx)



19131_024_110623.eps
110623

Figure 7-6 SSB key component overview Berlineale (xxPFL5x06D/xx)

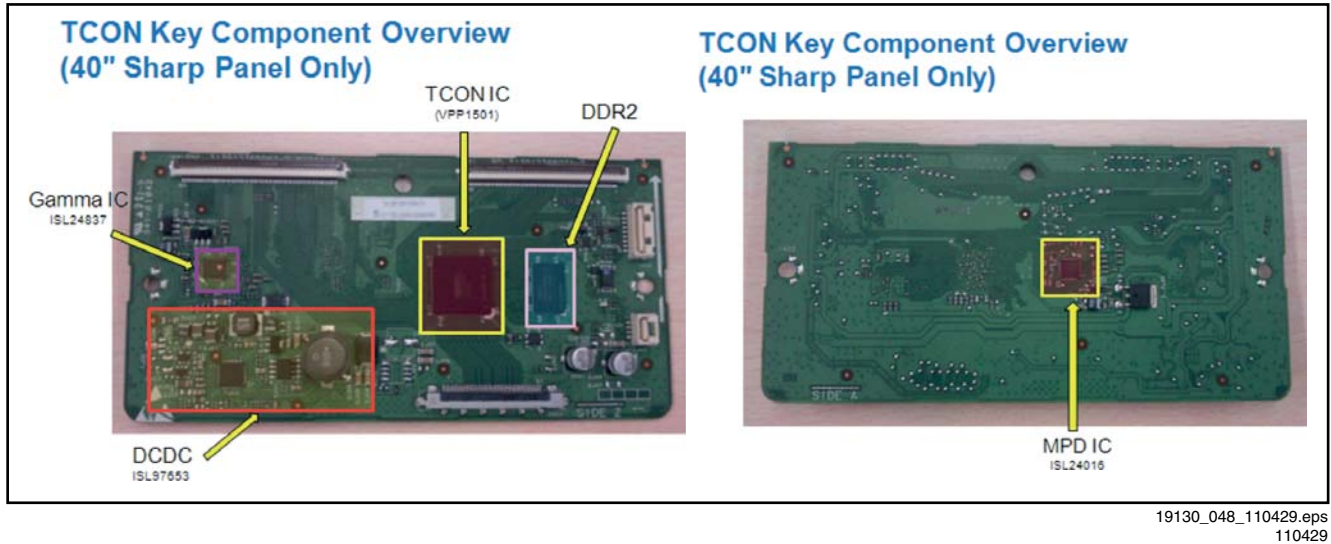


Figure 7-7 TCON key component overview

7.2 Power Supply

The Power Supply Unit (PSU) in this chassis is a buy-in and is a black-box for Service. When defective, a new panel must be ordered and the defective panel must be returned for repair, unless the main fuse of the unit is broken. Always replace the fuse with one with the correct specifications! This part is commonly available in the regular market.

Refer to [Figure 7-8](#) and [Figure 7-9](#) for details

The power supply system consists of stand-by, switched and regulated voltages. The stand-by voltage, +3V3STBY, will be available once AC supply is provided to the system. As for the other voltages, namely switched and regulated voltages, these are available once the STANDBY signal is pulled "low" to allow other supplies from the IPB to turn "on". The switched supplies are generated from the main +12VS supply, while the regulated supplies are derived from the switched supplies. There are a number of detection circuits to detect the following supplies: +12VS, +12Vdisp and +3V3_SW. The +12VS is the main supply voltage from the IPB that enables the switched voltages to be generated. The +12Vdisp is the supply to the display timing controller, while the +3V3_SW is powering the microprocessor and its flash memory.

The mains power supply unit distribute the following voltages to the TV system: +3V3STBY, 12VS, +24Vaudio, and +24Vpanel for panel with inverter (or) high voltage (HV) for inverterless panel. Requirement of the High Voltage depend on the specification of the LCD panel.

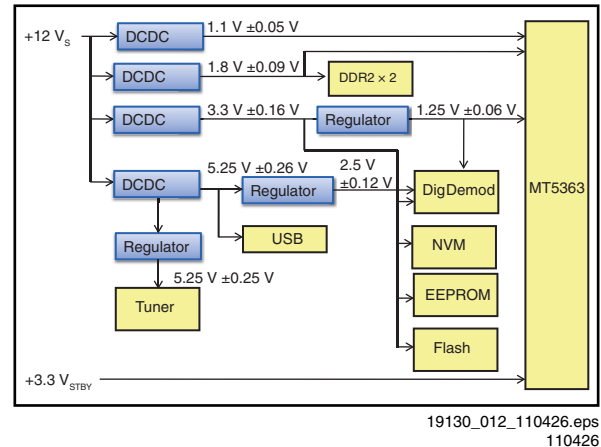


Figure 7-8 Power distribution overview

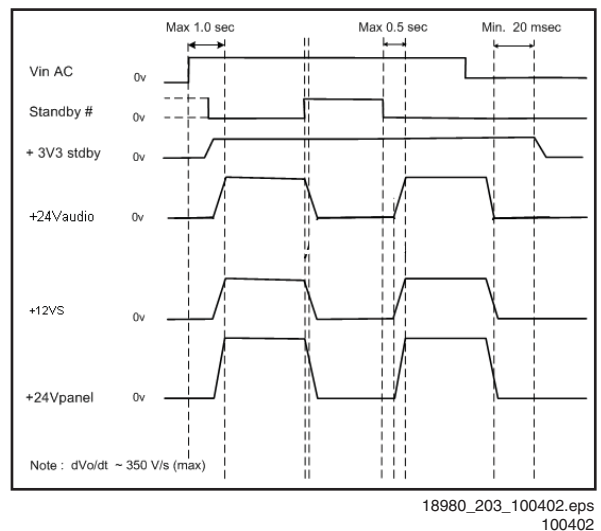


Figure 7-9 Power timing overview

7.3 Video

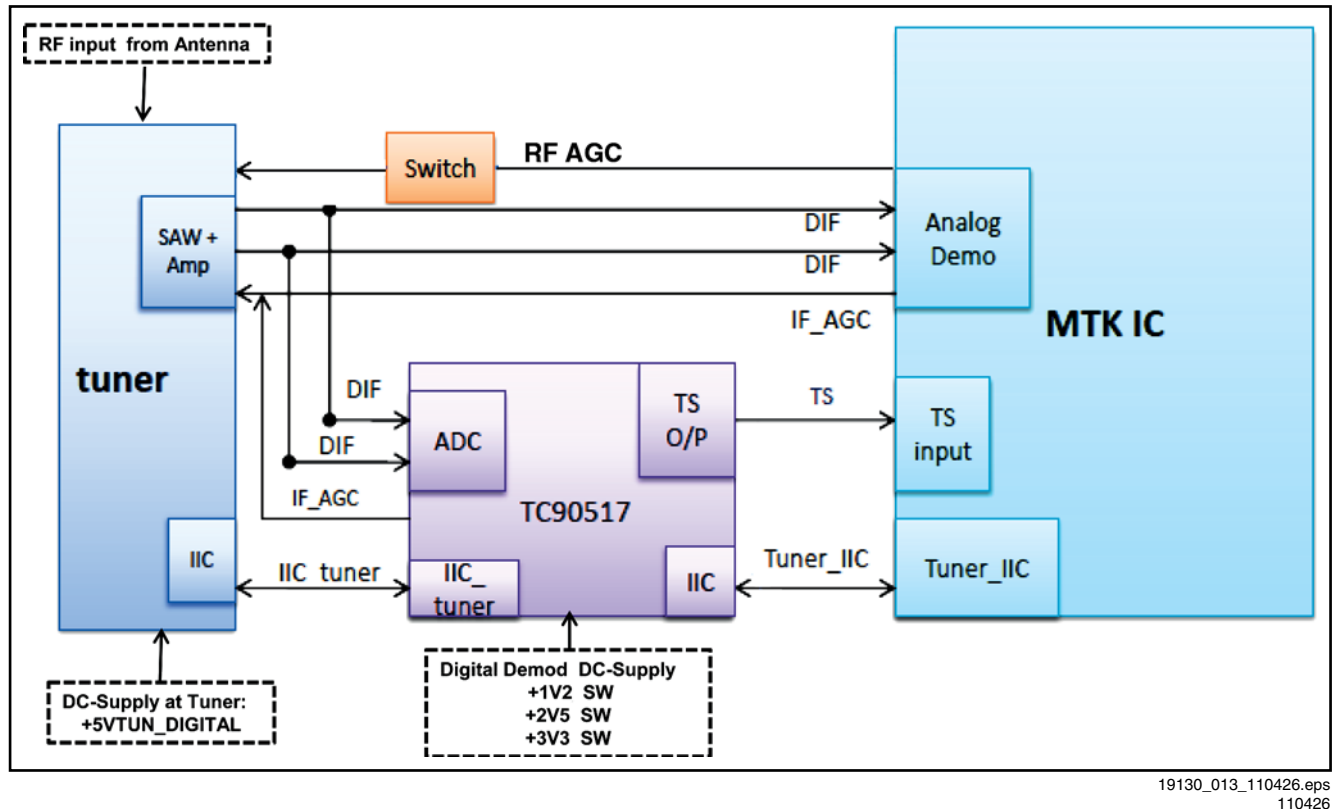
7.3.1 Video: Front-End

Key components for the tuner section are:

- Sharp Half NIM tuner VA1E1BF2403,

- Toshiba channel decoder TC90517 (external ISDB-T channel decoder).
- Analog demodulator (using internal MT5363 analog demodulator - pin AH35 VIP, AH37 VIN).

Refer to [Figure 7-10](#) for details.



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Figure 7-10 Front-end functional block diagram

7.4 Audio

In this chassis, audio processing is done by the following key components:

- MT5363 micro-processor for input selection and audio processing,
- TPA3123D2 class-D power amplifier for 2 x 10 W amplification.

The audio profile (optimal setting per screen size and styling) is stored at Option 10 (bit 0 to bit 4). Profile 1 for 32-inch Dali and profile 2 for 40-inch Dali.

Table 7-1 Microprocessor control lines - 1 -

From uP	At class D	Usage
SW_MUTE	SW_MUTE	Will pull audio signals to LOW upon DC drops, help to eliminate pop sound.
RESET_AUDIO	A_STBY	Control SHUTDOWN pin of class D amplifier: ON/OFF the amplifier
MUTE	MUTE	Corresponding to the MUTE button on Remote Control, to mute/unmute speakers
DC_PROT	DC_PROT	Detecting present of DC at speakers output and feedback to uP. This will trigger TV into protection mode. This is important to protect speakers

Table 7-2 Microprocessor control lines - 2 -

From uP		A_STBY to class D	Class D outputs
SW_MUTE	LOW	-	MUTE
	HIGH	-	Operating (unmute)
RESET_AUDIO	LOW	HIGH	Operating (unmute)
	HIGH	LOW	Class D shutdown (mute)
MUTE	LOW	-	Operating (unmute)
	HIGH	-	MUTE
DC_PROT	LOW	-	DC detected -> set going to protection
	HIGH	-	No DC -> normal operating

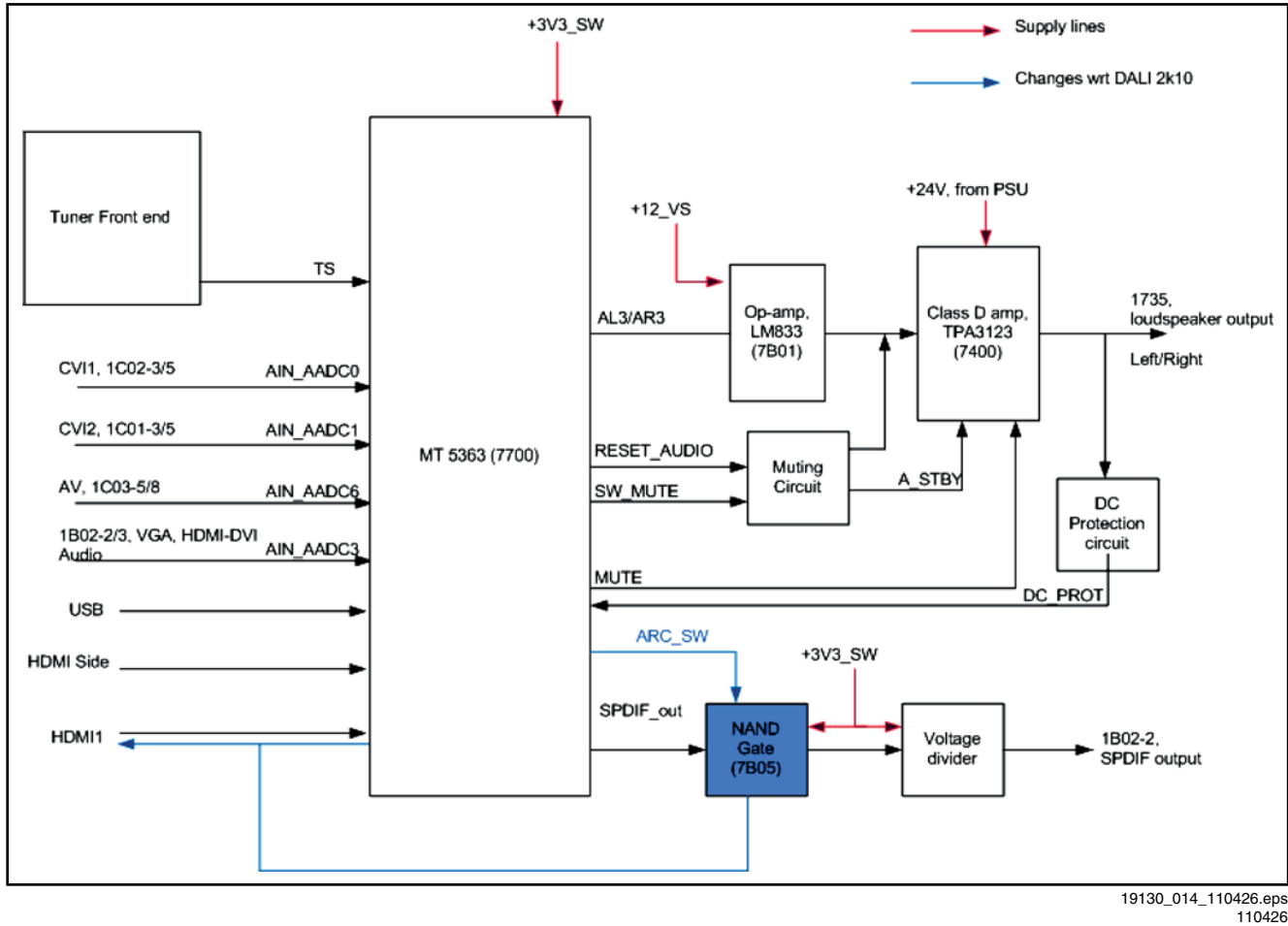


Figure 7-11 Audio signal flow

7.5 Inputs

7.5.1 Inputs: HDMI

In this chassis, the main Mediatek MT5363 SoC has an on-chip HDMI multiplexer. Refer to [Figure 7-12](#) for the implementation.

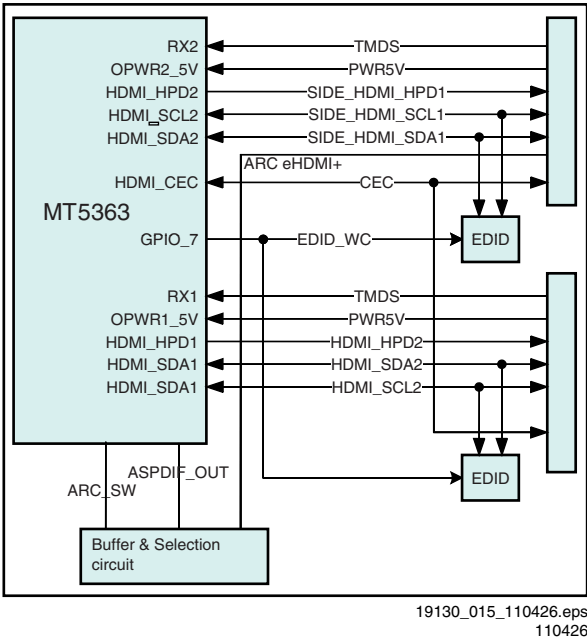


Figure 7-12 HDMI implementation

Signal description:

- TMDS: Signals that contain audio and video information.
- PWR5V: Signal to detect the presence of any HDMI source connected to the TV's HDMI input port.

- SIDE_HDMI_HPD1 and HDMI_HPD2: Signal to initiate reading of the TV EDID data by the source device.
- I2C: The EDID data reading and the HDCP authentication process runs via I2C.
- CEC: Signal direct connected between inputs and uP.
- EDID_WC: Signal used to disable the write protect pin of the EEPROM. When updating, the program will temporarily pull this pin "LOW" before writing new data.

7.5.2 Inputs: USB

In this chassis, the main Mediatek MT5363 SoC has an on-chip USB processor.

Refer to [Figure 7-13](#) for the implementation.

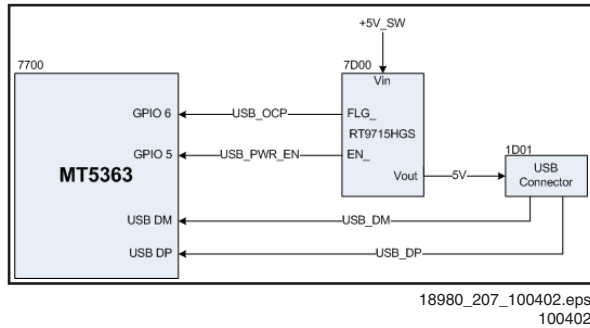


Figure 7-13 USB implementation

8. IC Data Sheets

This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs).

8.1 Diagram B01, Type TPS54386 (IC7116 and 7117)

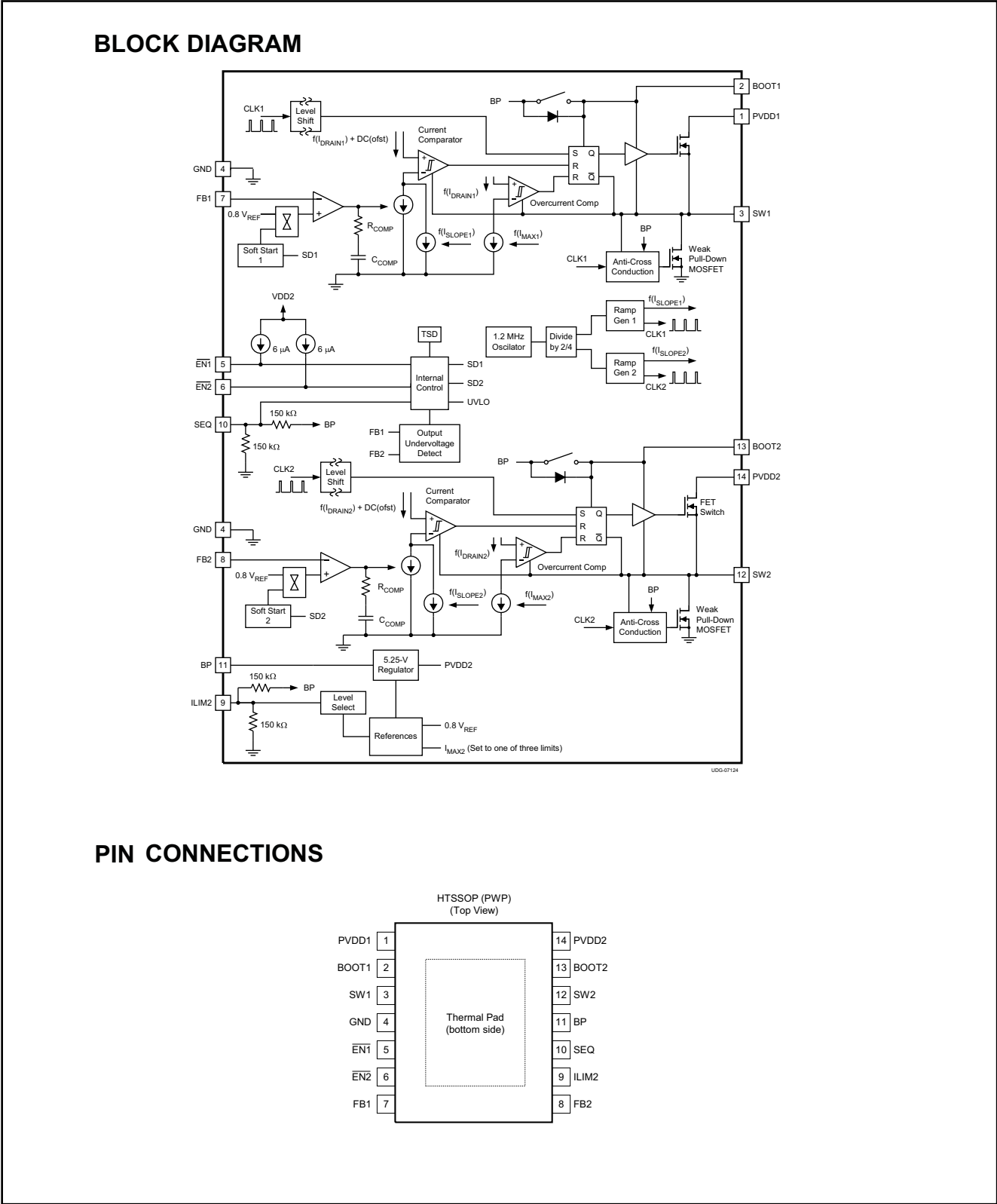


Figure 8-1 Internal block diagram and pin configuration

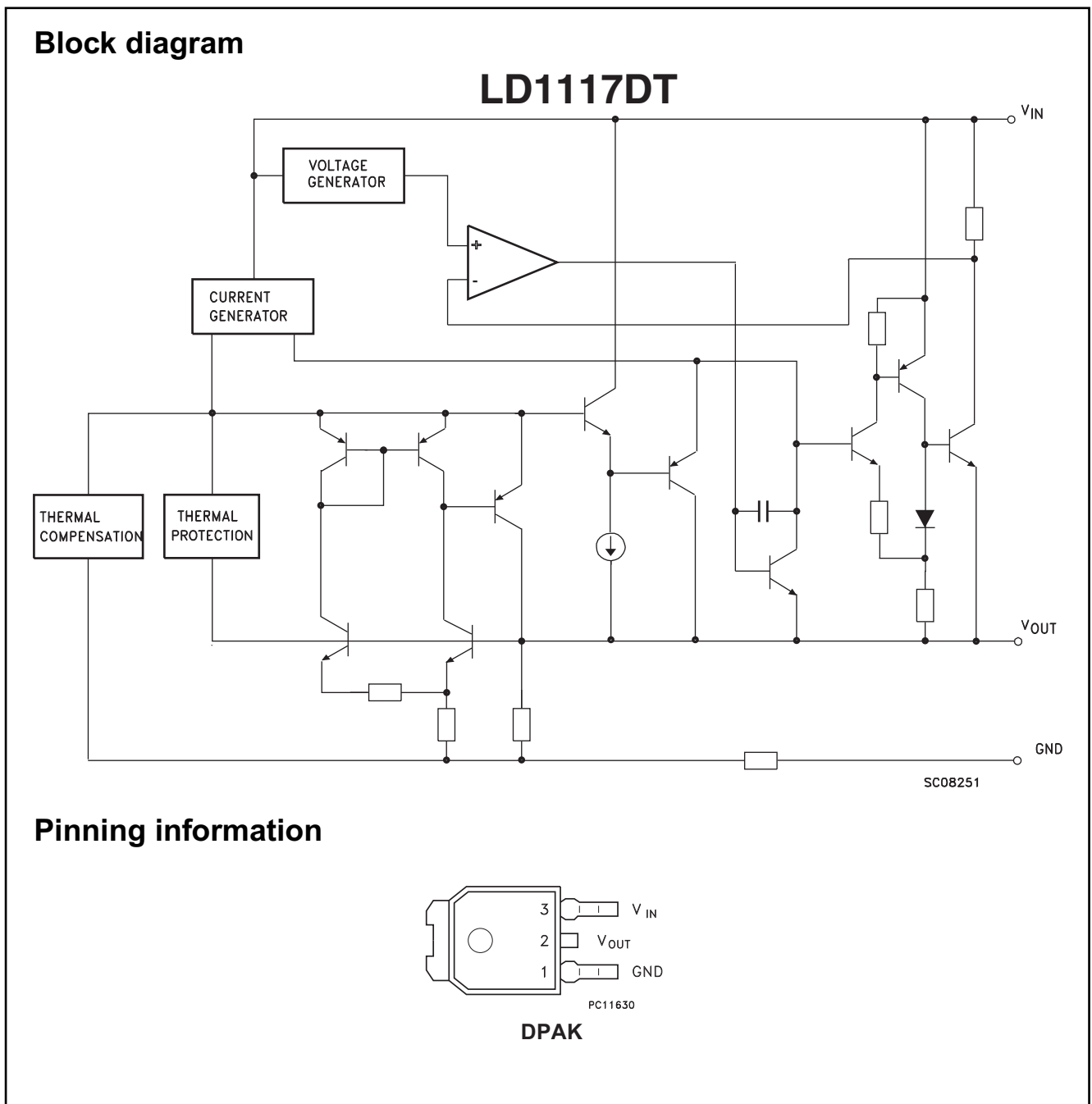
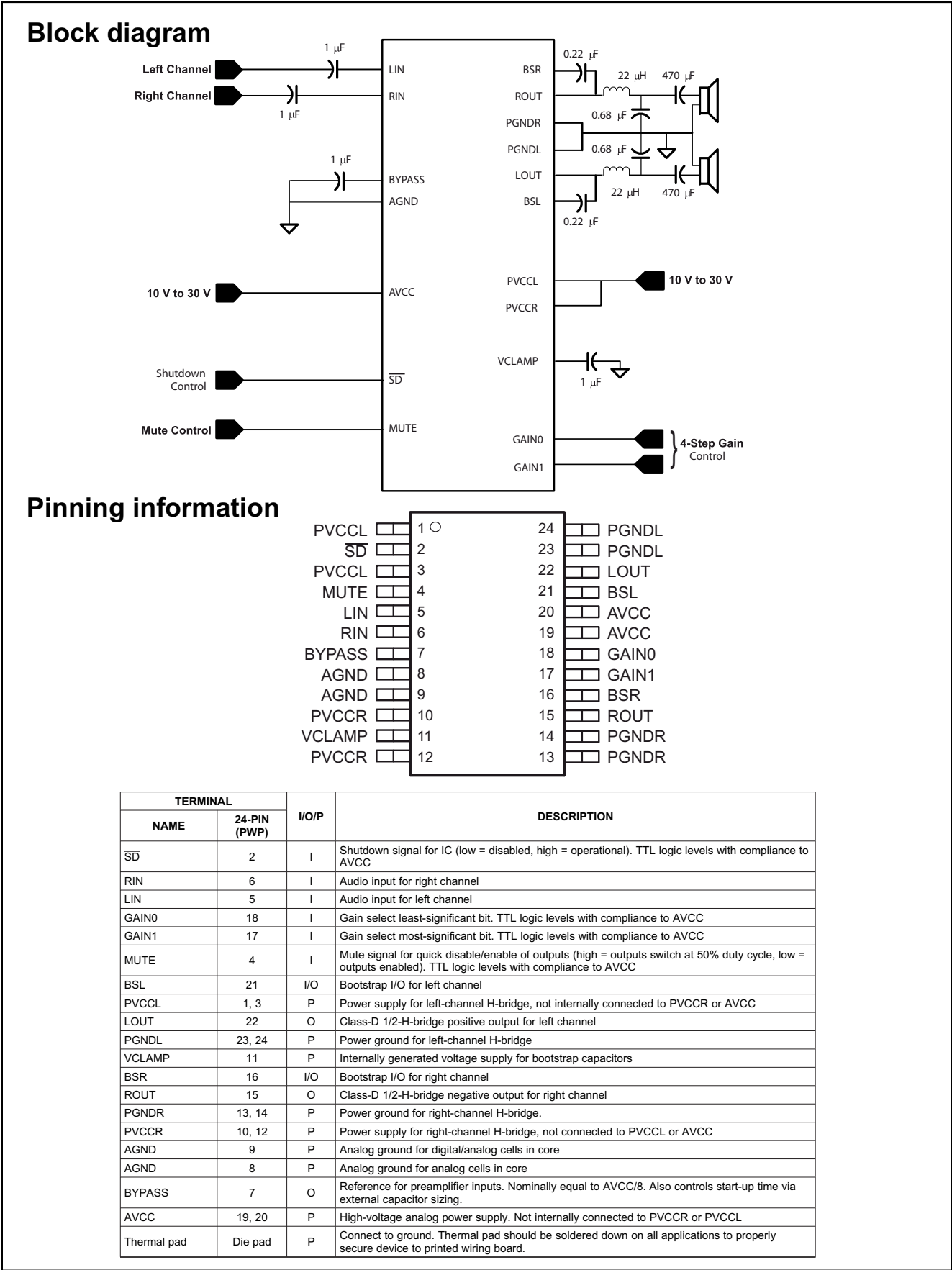
8.2 Diagram B01A **DC-DC**, Type LD1117D (IC7119)F_15710_166.eps
100402

Figure 8-2 Internal block diagram and pin configuration

8.3 Diagram B03 [Class-D & muting](#), Type TPA3123 (IC7400)



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Figure 8-3 Internal block diagram and pin configuration

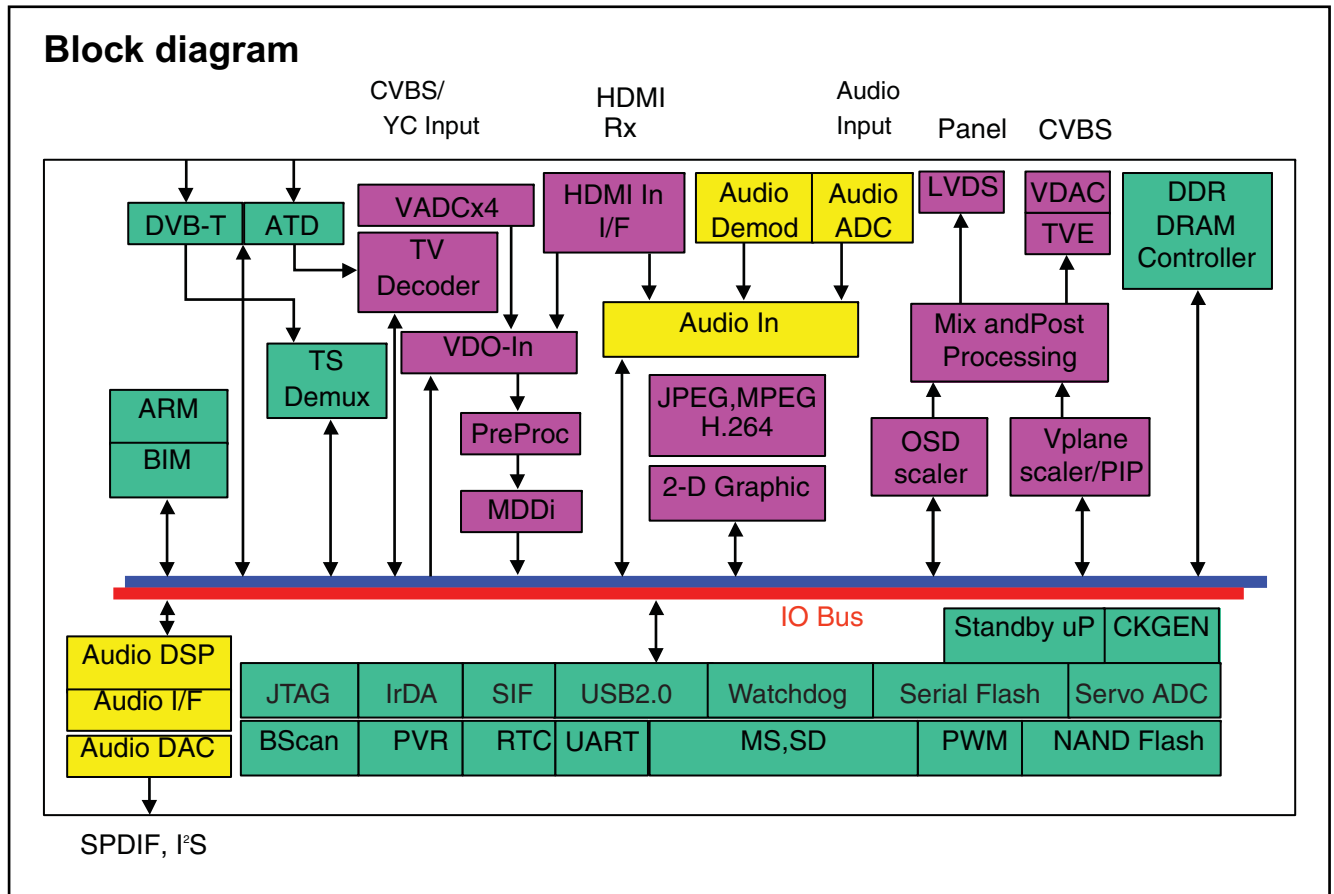
8.4 Diagram B04 [MT5363 Power](#), Type MT5363 (IC7700)18850_300_100107.eps
100222

Figure 8-4 Internal block diagram

Pinning information

LT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
A		RCLK0_		RDQ10		RDQ15		RDQS0_		RDQ14		RDQ12				AO1N		AOCKN	
B	VCC2IO		RCLK0		RDQ8		RDQS1		RDQS0		RDQ11		VCC2IO			AO0N		AO2N	AO3N
C		VCC2IO		RDQ13		RDQS1_		DVSS		RDQM1		VCC2IO				AO1P		AOCKP	
D	RA9		VCC2IO		RDQ5		RDQ0		DVSS		RDQ9		VCC2IO		AO3P		AO2P		AO3P
E		RA12		VCC2IO		RDQ2		DVSS		RDQM0		VCC2IO		VCC2IO		AE0N		AE2N	
F	RA5		RA7		VCC2IO		RDQ7		DVSS		RDQ6		VCC2IO		AVDD33_L VDS		AE1N		AECKN
G		RA10		RA3		VCC2IO		DVSS		DVSS		RDQ3		VCC2IO		AE0P		AE2P	
H	RBA2		RBA0		RA1		VCC2IO				RDQ1		RDQ4		AVDD33_L VDS		AE1P		AECKP
J		RBA1		DVSS		DVSS								VCC2IO				AVSS33_L VDS	
K	RCKE		RWE_		MEMTN		MEMTP												
L		RCAS_		DVSS		DVSS													
M	RA13		RA2		RA4		RA6												TP_VPLL
N		RA11		RA0		RODT		RVREF						DVSS		AVDD12_L VDS		AVDD12_V PLL	
P	RA8		RCS_		RRAS_		RVREF						AVDD12_M EMPLL		DVSS		AVSS12_L VDS		AVSS12_V PLL
R		VCC2IO		VCC2IO		VCC2IO								DVSS		VCKK		DVSS	
T	RDQ19		RDQ20		RDQ30		RDQ25						AVSS12_M EMPLL		DVSS		DVSS		DVSS
U		RDQ22		RDQ17		RDQM3								VCKK		DVSS		DVSS	
V	RDQM2		RDQS2		RDQ28		RDQ27							VCKK		DVSS		DVSS	DVSS
W		RDQS2_		DVSS		DVSS								DVSS		DVSS		DVSS	
Y	RDQS3		DVSS		RDQ24		RDQ31							VCKK		VCKK		DVSS	DVSS
AA		RDQS3_		RDQ29		RDQ26								VCKK		DVSS		DVSS	
AB	RDQ16		RDQ23		REXTDN								DVSS		DVSS		DVSS		DVSS
AC		RDQ21		RDQ18		VCC2IO								DVSS		DVSS		DVSS	
AD	RCLK1		RCLK1_		VCC2IO		VCC2IO						DVSS		VCKK		VCKK		VCKK
AE		VCC2IO		VCC2IO		GPIO39		DVSS						VCKK		VCKK		VCKK	
AF	VCC2IO		VCC2IO		GPIO37		GPIO40		DVSS					VCCIO33-1		VCCIO33-1			
AG		GPIO38		GPIO41		GPIO42							VCKK						
AH	GPIO44		GPIO43		JTDO		VCKK		VCKK										
AJ		JTDI		JTMS		VCKK		VCKK											
AK	JTRST_		JTCK		VCKK		VCKK												
AL		VCKK		VCKK		VCKK		VCKK		AVDD12_U SB		HDMI_SCL 2		HDMI_SDA 2		PWR5V_1		HDMI_HPD 1	
AM	VCKK		VCKK		VCKK		VCKK		AVSS12_U SB		AVDD33_U SB		AVDD33_H DMI		PWR5V_2		HDMI_SCL 1		OPCTRL1
AN		VCKK		VCKK		POCE1_				USB_VRT		AVSS33_H DMI		HDMI_CEC		HDMI_HPD 2		HDMI_SDA 1	
AP	OSDA0		OSCL0		PDD1		PDD4		AVSS33_U SB		AVDD12_H DMI		RX2_0		RX2_2		RX1_0		RX1_2
AR		PDD0		PAALE		PDD2		PDD6		USB_DM		RX2_C		RX2_1		RX1_C		RX1_1	
AT	POCE0_		POWE_		PARB_		PDD5		AVSS33_U SB		AVSS33_U SB		RX2_0B		RX2_2B		RX1_0B		RX1_2B
AU		POOE_		PACLE		PDD3		PDD7		USB_DP		RX2_CB		RX2_1B		RX1_CB		RX1_1B	
AV	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

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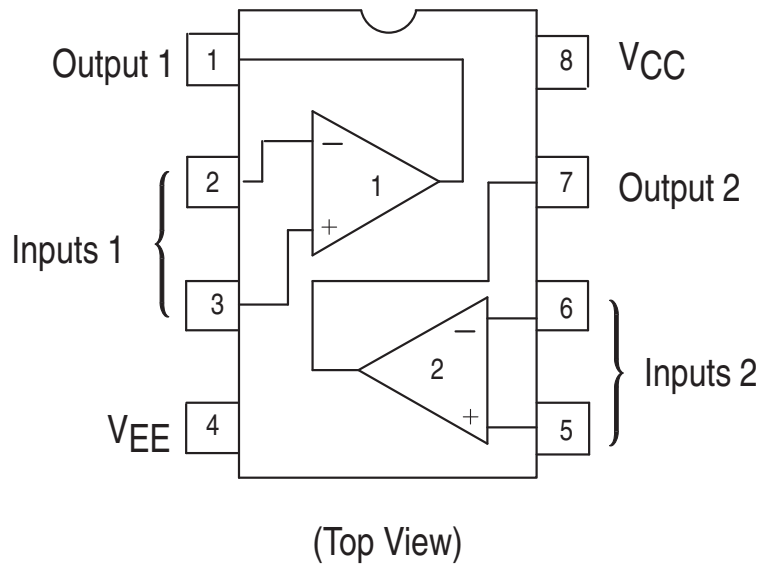
Figure 8-5 Internal block diagram

Pinning information

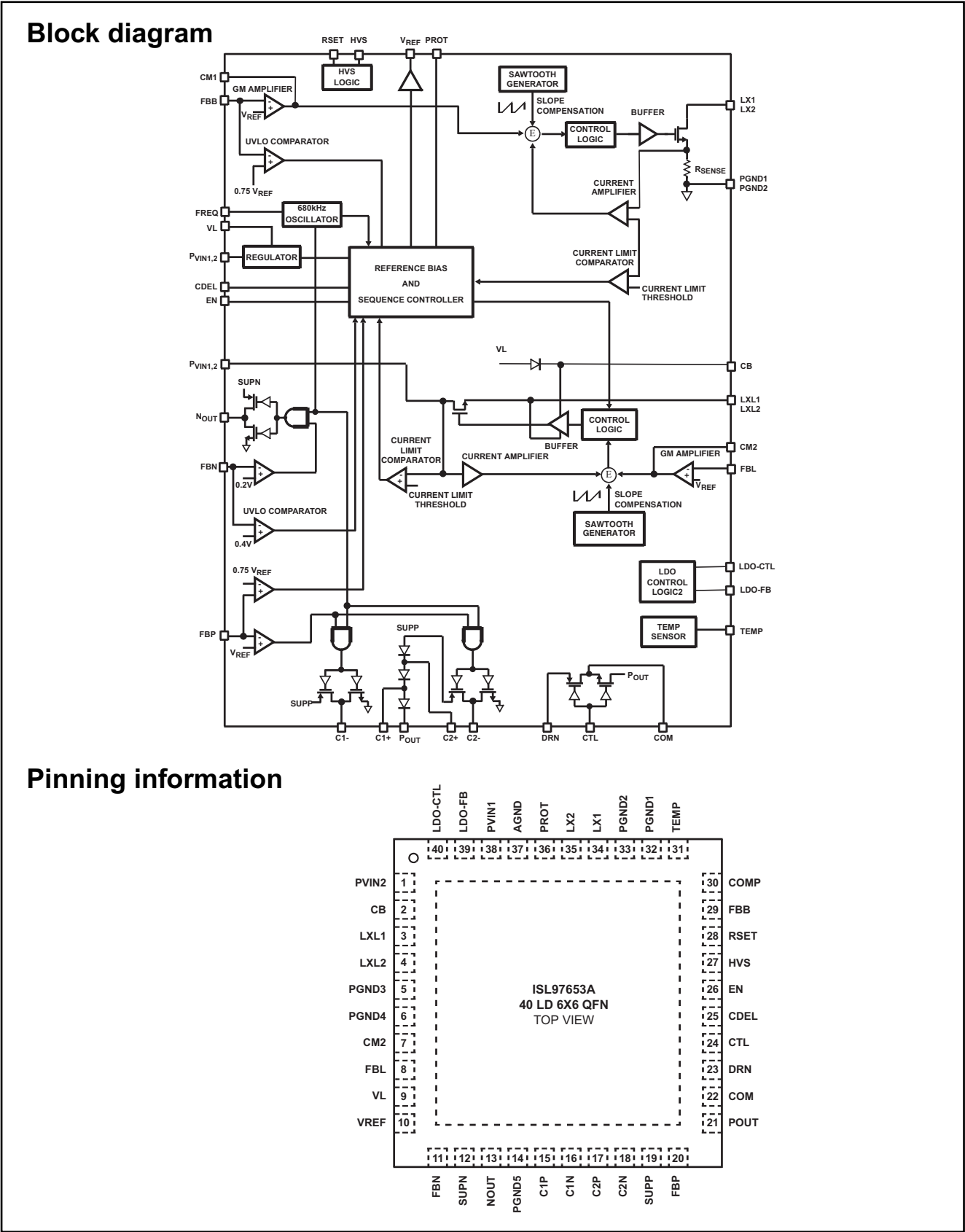
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	RT	
AO4N		GPIO35				GPIO21				GPIO3		ETTXD0		ETRXD2		ETRXD0		A	
	DVSS		GPIO32		GPIO26		GPIO17		GPIO9		ETTXD3		ETRXCLK		ETRXD1		ETRXDV	B	
AO4P		GPIO36		GPIO28		GPIO22		GPIO11		GPIO4		ETTXD1		ETRXD3		ETCRS		C	
	DVSS		GPIO34		GPIO27		GPIO18		GPIO10		ETTXEN		ETTXCLK		ETRXER		ETMDIO	D	
AE3N		DVSS		GPIO30		GPIO20		GPIO12		GPIO6		ETTXD2		ETTXER		ETMDC		E	
	AE4N		GPIO33		GPIO24		GPIO16		GPIO8		ETPHYCLK		CI_MCLK0		CI_MCLKI		CI_MOSTRT	F	
AE3P		DVSS		GPIO29		GPIO19		GPIO14		GPIO5		ETCOL		CI_MIVAL		CI_MOVAL		G	
	AE4P		VCCIO33		GPIO25		GPIO15		GPIO7		VCCIO33		CI_MISTR T		CI_MDIO		CI_MDO0	H	
				GPIO31		GPIO23		GPIO13		VCCIO33		GPIO2		OPWM0		OPWM1		J	
											AOSDATA3		ASPDIF		GPIO0		GPIO1	K	
										FSRC_WF		ALIN		AOBCK		AOSDATA0		L	
											IF_AGC		RF_AGC		AOMCLK		AOLRCK	M	
DVSS		VCCK		VCCK								AOSDATA4		TUNER_DATA		TUNER_CLK		N	
	DVSS		DVSS		DVSS						OSCL2		OSD2		AOSDATA1		AOSDATA2	P	
DVSS		DVSS		DVSS							OSDA1		OSCL1		U1RX			R	
	DVSS		DVSS		VCCK						AVDD33_A DAC1		OPWM2		U1TX		VCXO	T	
DVSS		DVSS		DVSS						AVSS33_A DAC1		AL1		AR2		AR3		U	
	DVSS		DVSS		VCCK						VCCIO33		AR1		AL2		AL3	V	
DVSS		DVSS		VCCK						AVDD33_R EF_AADC		VCCIO33		VCCIO33		VCCIO33		W	
	DVSS		DVSS		VCCK					AVSS33_R EF_AADC		AVDD33_A ADC		AVSS33_A ADC		AIN5_R_A ADC		AIN6_R_A ADC	Y
DVSS		DVSS		VCCK						VMID_AADC		AIN4_L_AADC		AIN5_L_AADC		AIN6_L_AADC		AA	
	DVSS		DVSS		VCCK						AIN1_L_AADC		AIN4_R_AADC		AIN2_R_AADC		AIN3_R_AADC	AB	
DVSS		DVSS		DVSS							AIN1_R_AADC		AIN0_R_AADC		AIN3_L_AADC			AC	
	DVSS		DVSS		DVSS							AIN0_L_AADC		AIN2_L_AADC				AD	
VCCK		VCCK		DVSS										AVSS33_A DAC0		AR0		AE	
									AVDD12_T VDPLL				AVDD33_A DAC0		AVICM		AL0	AF	
										AVDD12_A PLL		AVDD12_S YSPLL		AVDD33_A DEM0D1		AVSS33_D EMOD1		AG	
									AVSS12_P LL		AVSS12_P LL		AVDD12_A DCPLL		ADCINN_D EMOD		ADCINP_D EMOD	AH	
										AVSS33_D IG				XTALO		XTALI		AJ	
									AVSS33_S F		AVDD33_D IG		ADIN1_SR V		AVDD33_X TAL_STB		AVSS33_X TAL	AK	
OPWRSB		ORESET		AVSS33_V GA_STB						AVDD33_S IF		ADIN0_SR V		ADIN3_SR V		ADIN5_SR V		AL	
	OPCTRL0		AVDD10_L DO		AVDD12_R GB				FS_VDAC		BYPASS0		AF		ADIN2_SR V		ADIN4_SR V	AM	
OPCTRL2		OIRI		AVDD33_V GA_STB		AVSS12_R GB				AVDD33_V DAC		AVDD33_C VBS		MPXP		MPXN		AN	
	U0TX		SOG		SOY1		PR1P		PB0P		VDAC_OUT1		SY0		CVBS2P		TUNER_BY PASS	AP	
OPCTRL3		HSYNC		COM		COM1		Y0P		AVSS33_V DAC		AVSS33_C VBS		SY1		CVBS0N		AR	
	U0RX		BP		RP		PB1P		COM0		VDAC_OUT1 2		SC0		CVBS3P		CVBS0P	AT	
OPCTRL4		VSYNC		GP		Y1P		SOY0		PR0P				SC1		CVBS1P		AU	
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	RB	

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100222

Figure 8-6 Internal block diagram

8.5 Diagram B06B [Analog I/O - Audio](#), Type LM833 (IC7B01)**Pinning information**18520_306_090325.eps
100402**Figure 8-7 Pin configuration**

8.6 Diagram T01C [TCON DC/DC](#), Type ISL97653 (IC7J00)



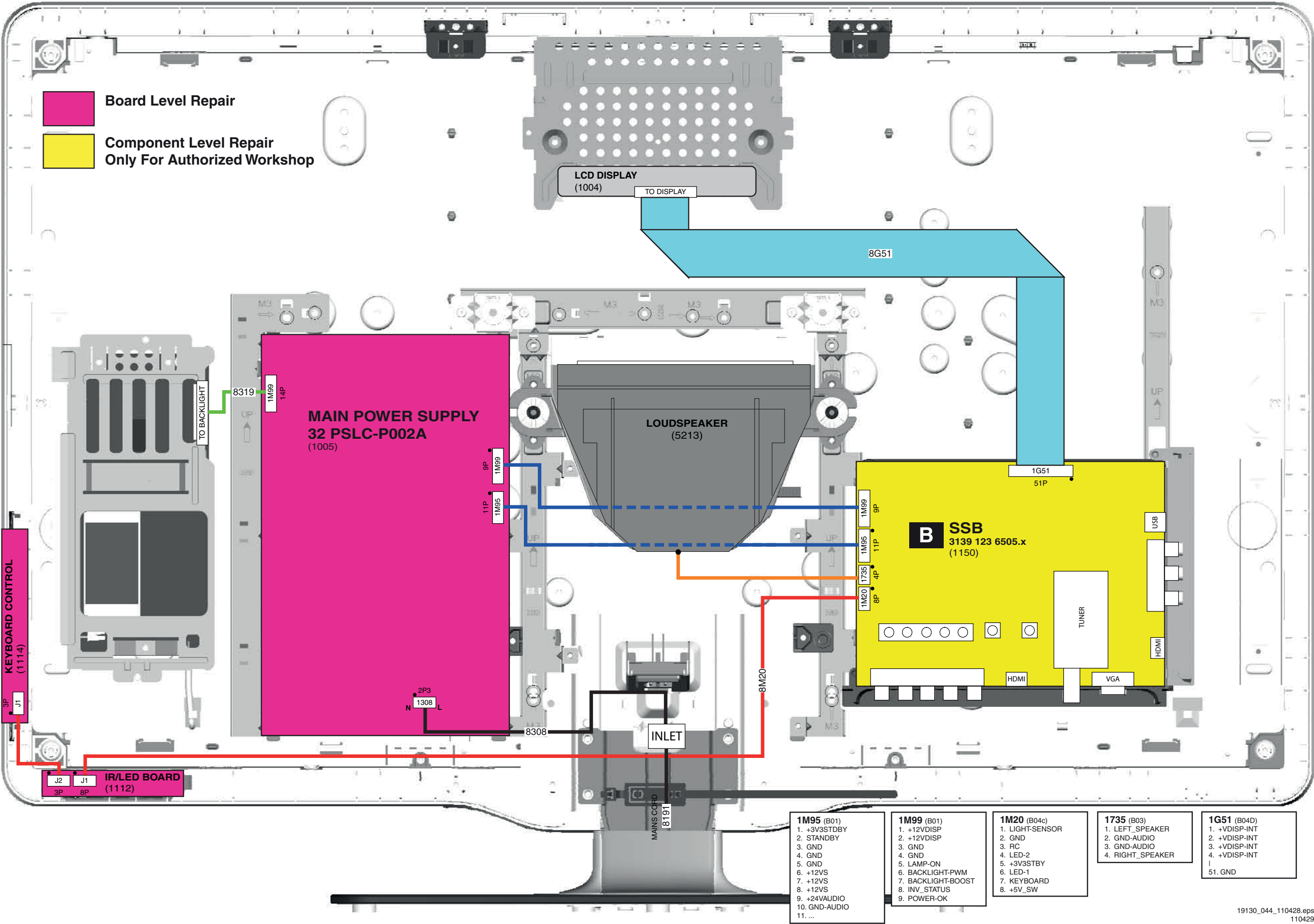
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100217

Figure 8-8 Internal block diagram and pin configuration

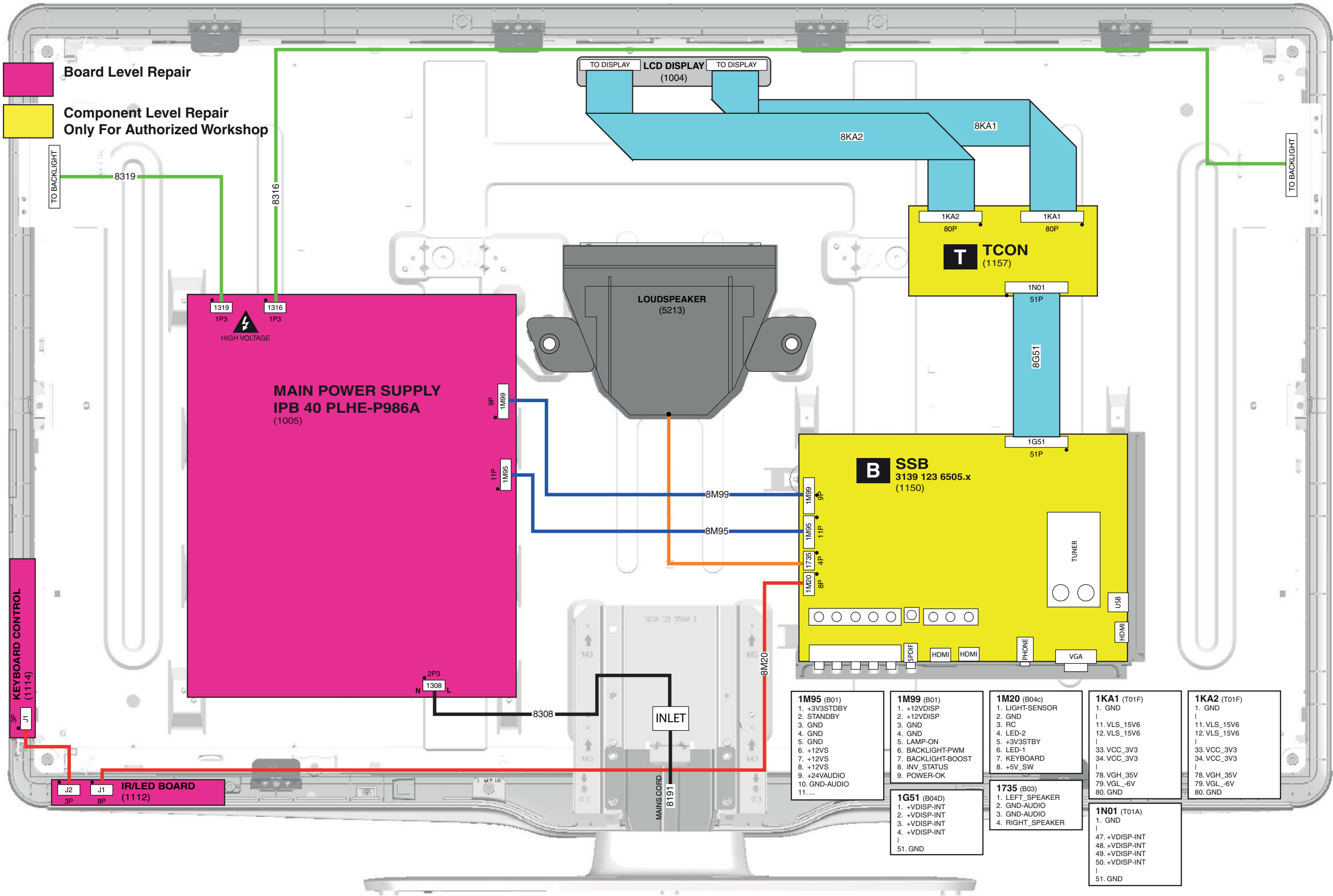
Personal Notes:

9. Block Diagrams

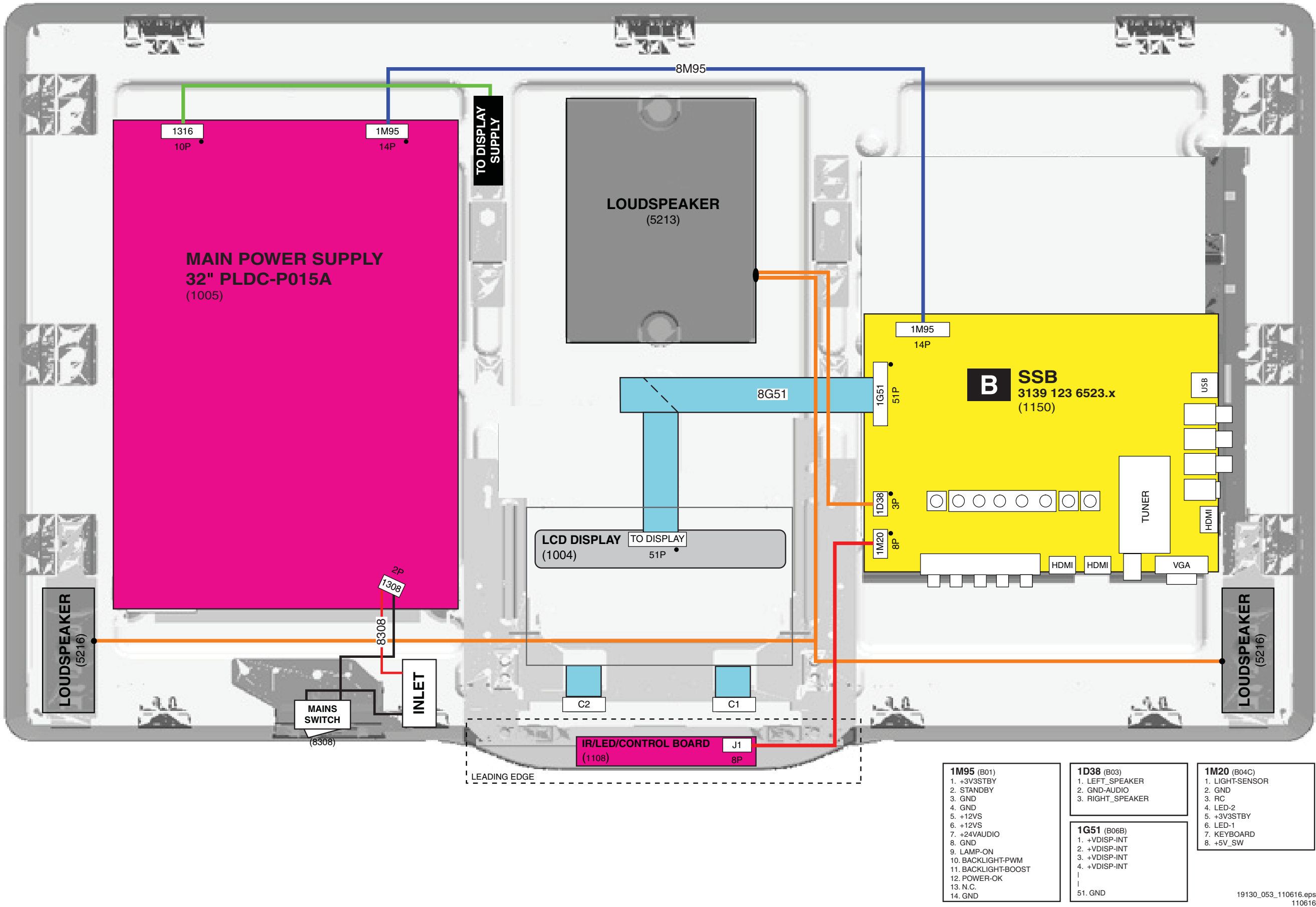
9-1 Wiring Diagram 32" (Thriller)
WIRING DIAGRAM 32" THRILLER



9-2 Wiring Diagram 40" (Thriller)
WIRING DIAGRAM 40" THRILLER

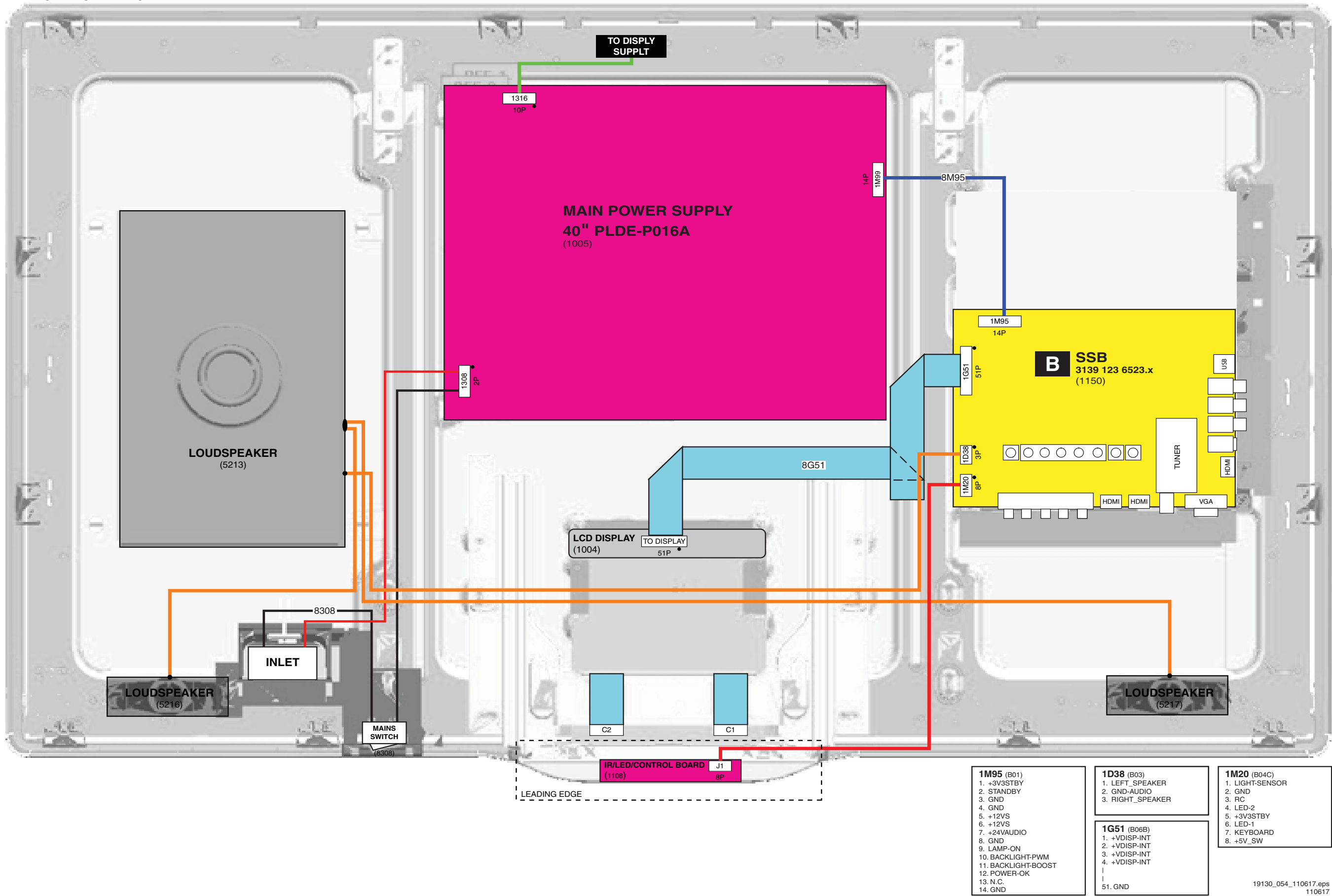


9-3 Wiring Diagram 32" (Berlinale)
WIRING DIAGRAM 32" BERLINALE

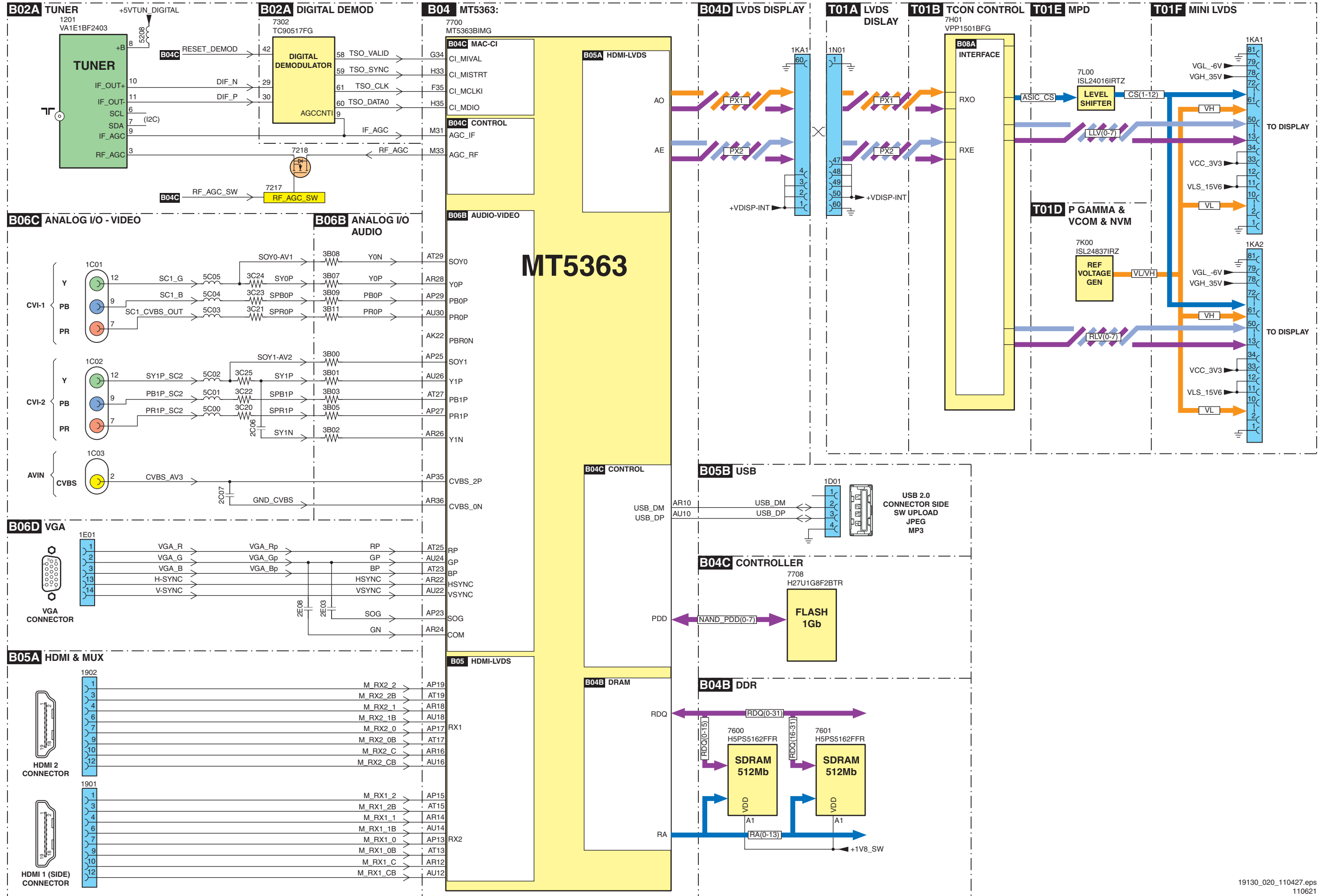


9-4 Wiring Diagram 40" (Berlinale)

WIRING DIAGRAM 40" BERLINALE

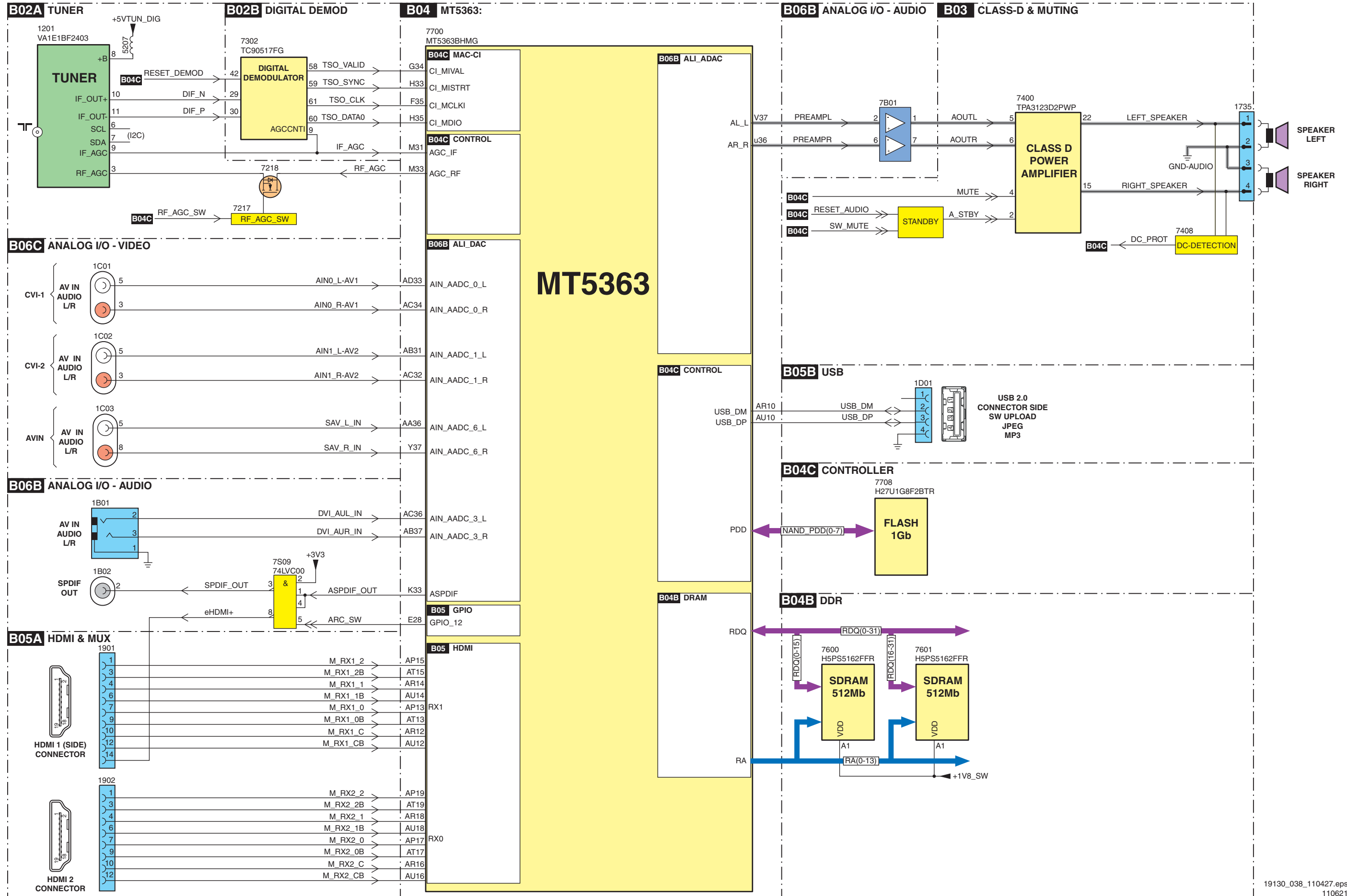


9-5 Block Diagram Video 3939 123 65052
VIDEO SBB 3139 123 6505.x

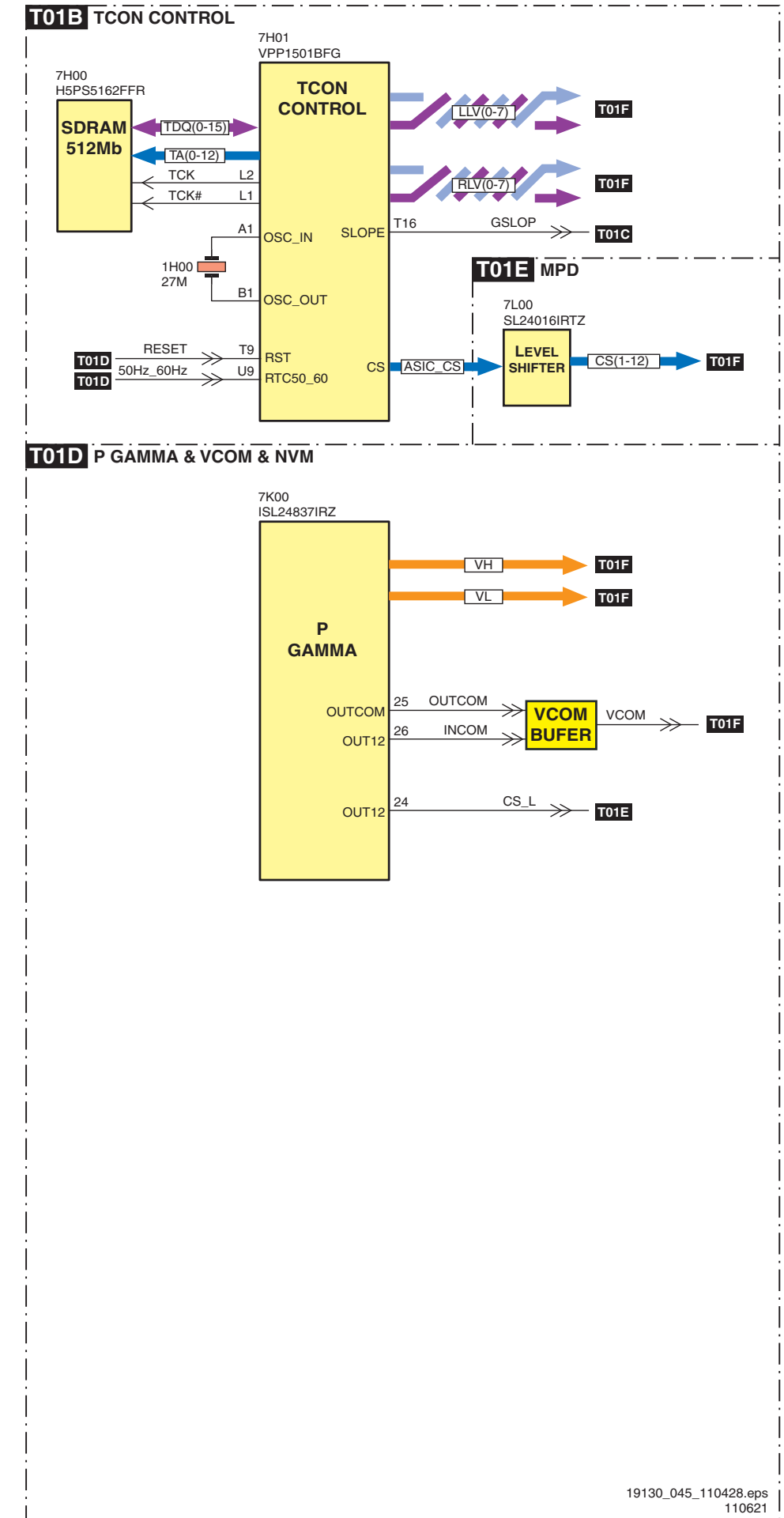
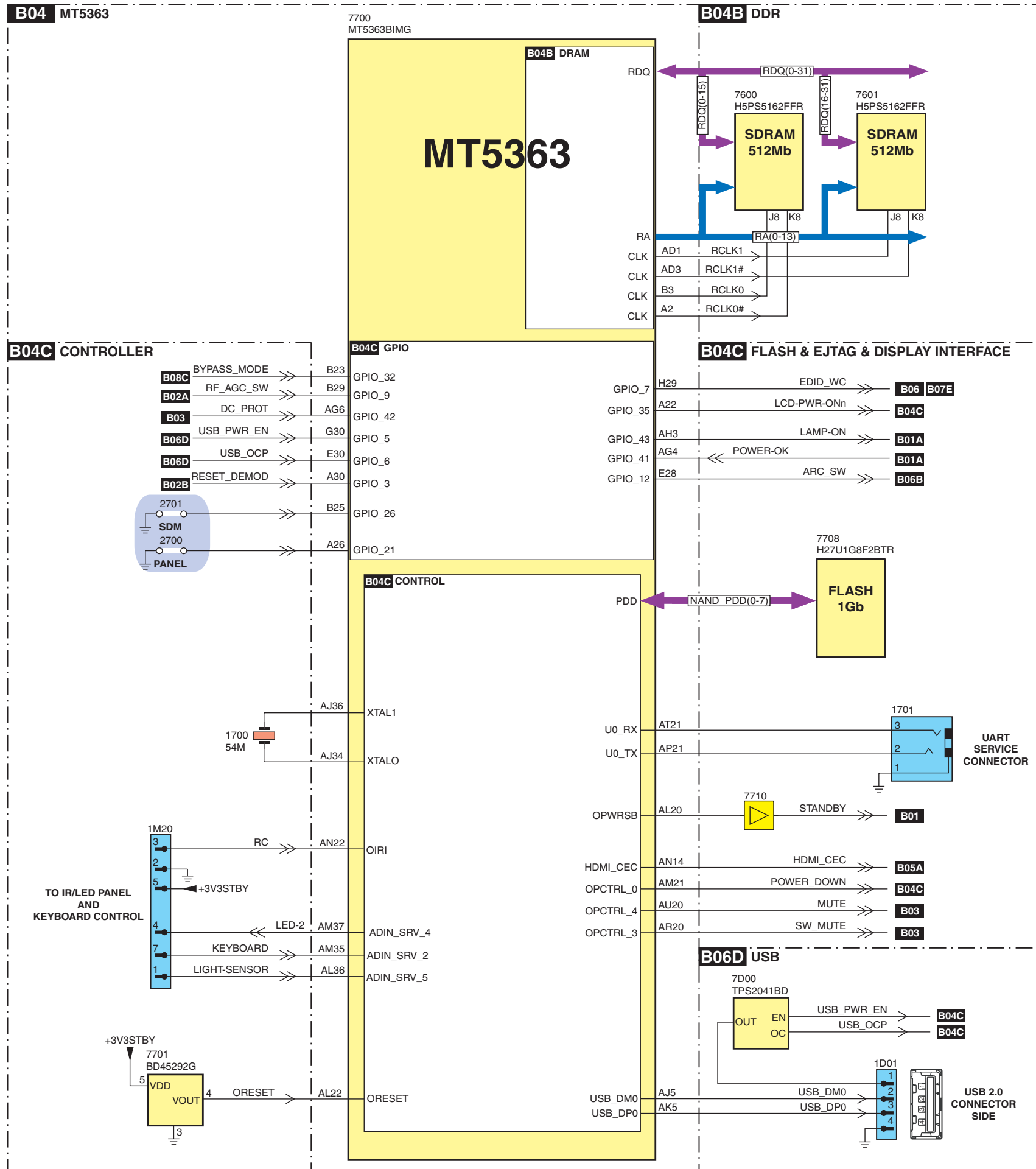


9-6 Block Diagram Audio 3939 123 65052

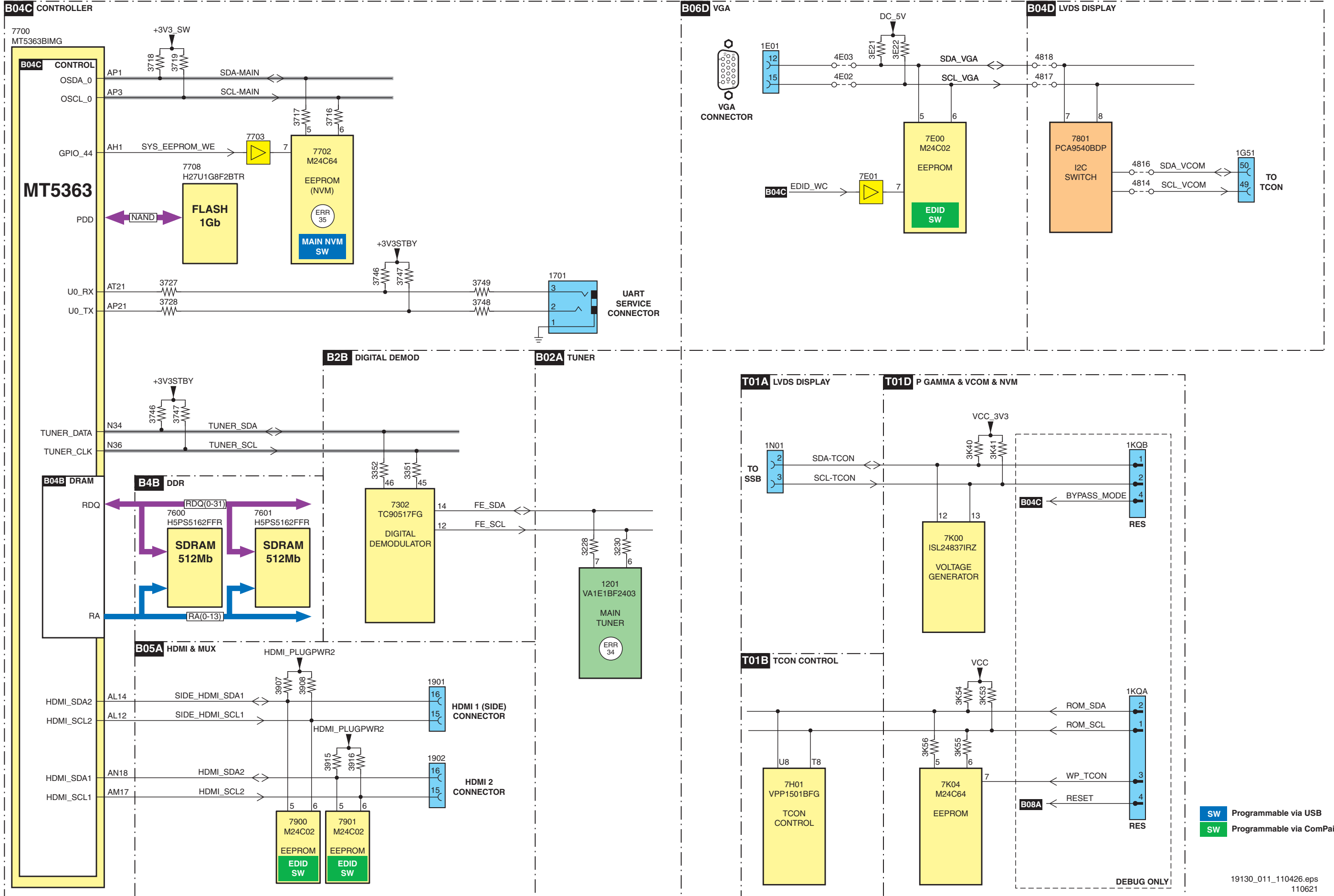
AUDIO SBB 3139 123 6505.x



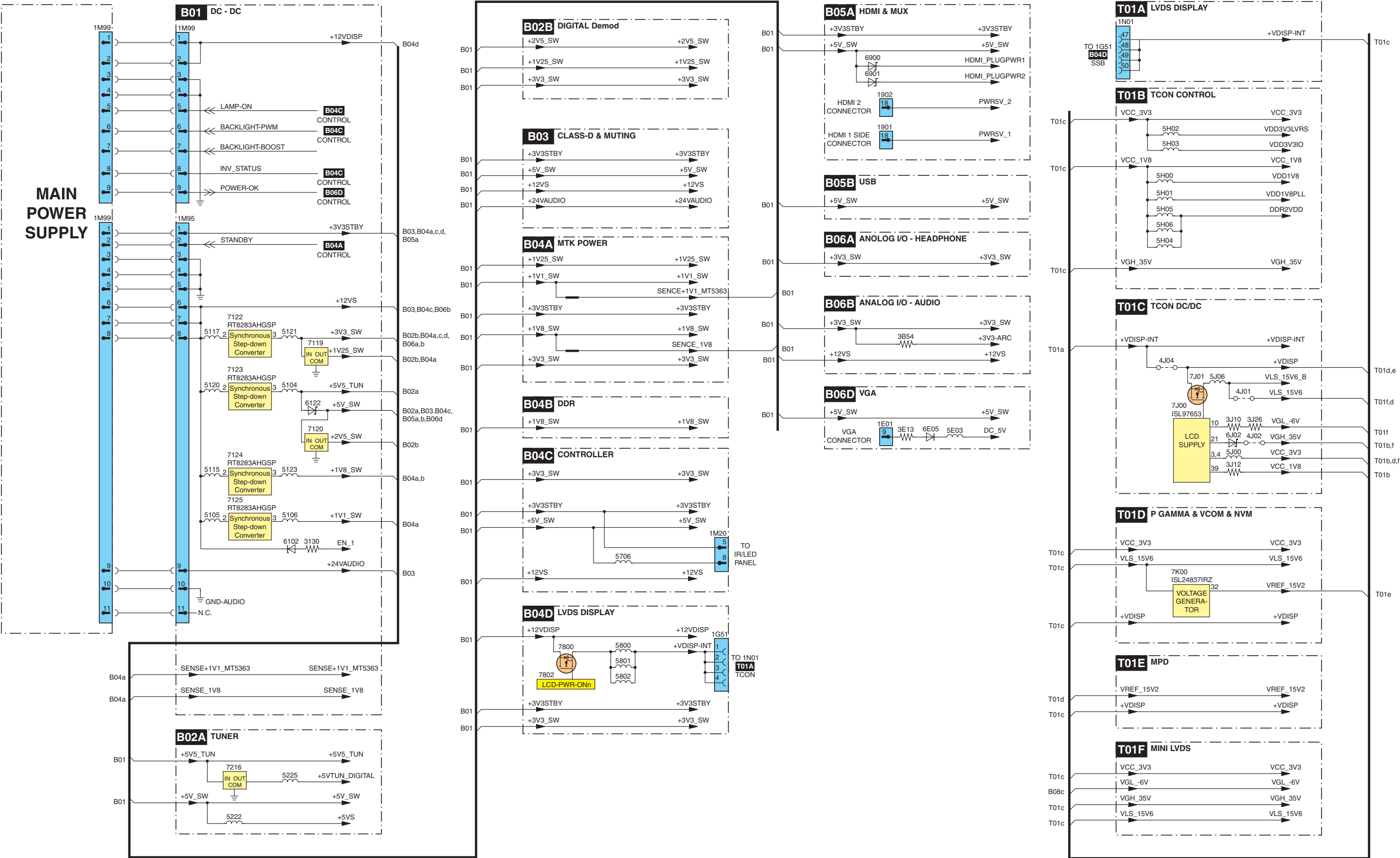
9-7 Block Diagram Control & Clock Signals 3939 123 65052 CONTROL + CLOCK SIGNALS SBB 3139 123 6505.x



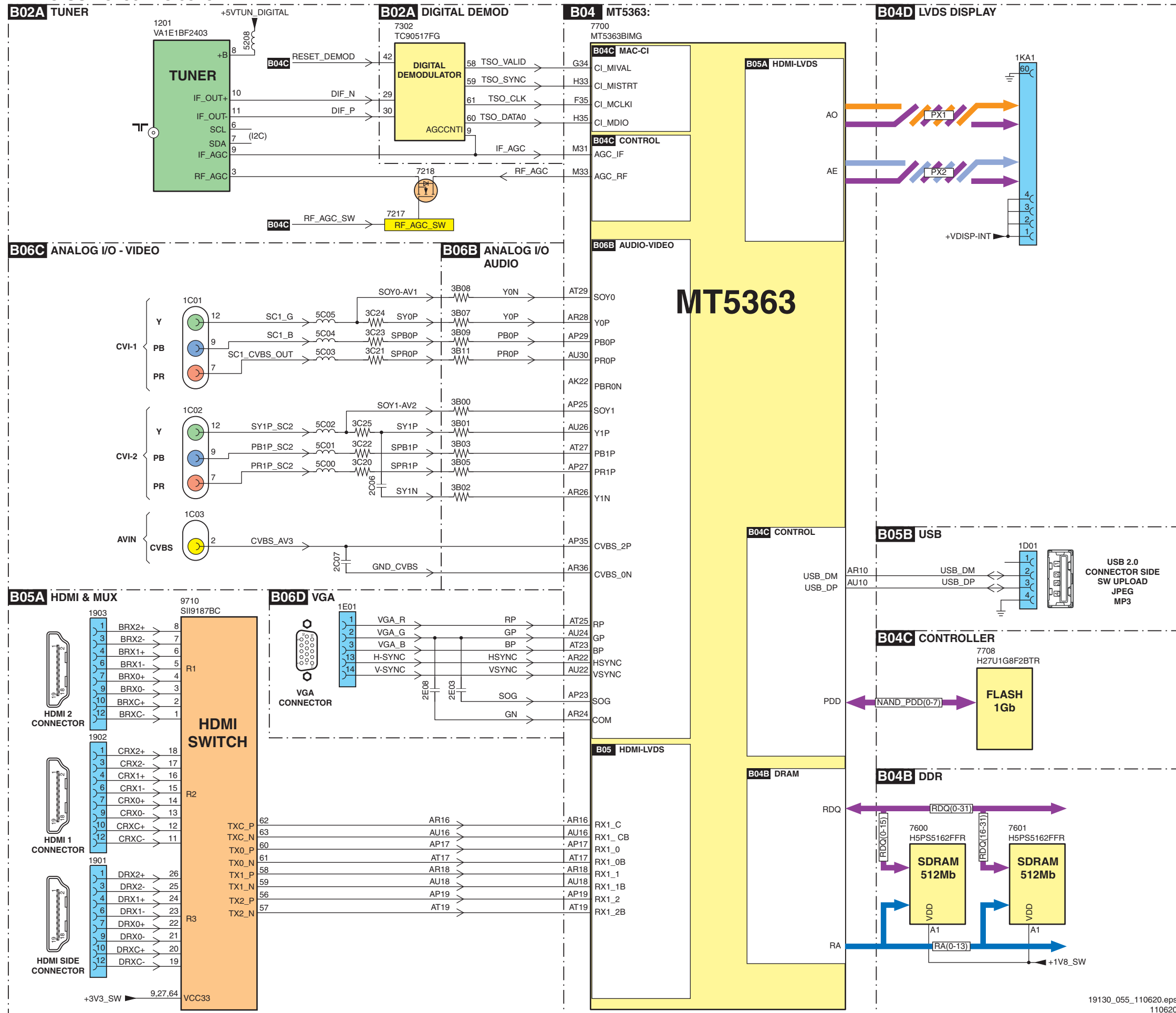
9-8 Block Diagram I²C 3939 123 65052 I²C SBB 3139 123 6505.x



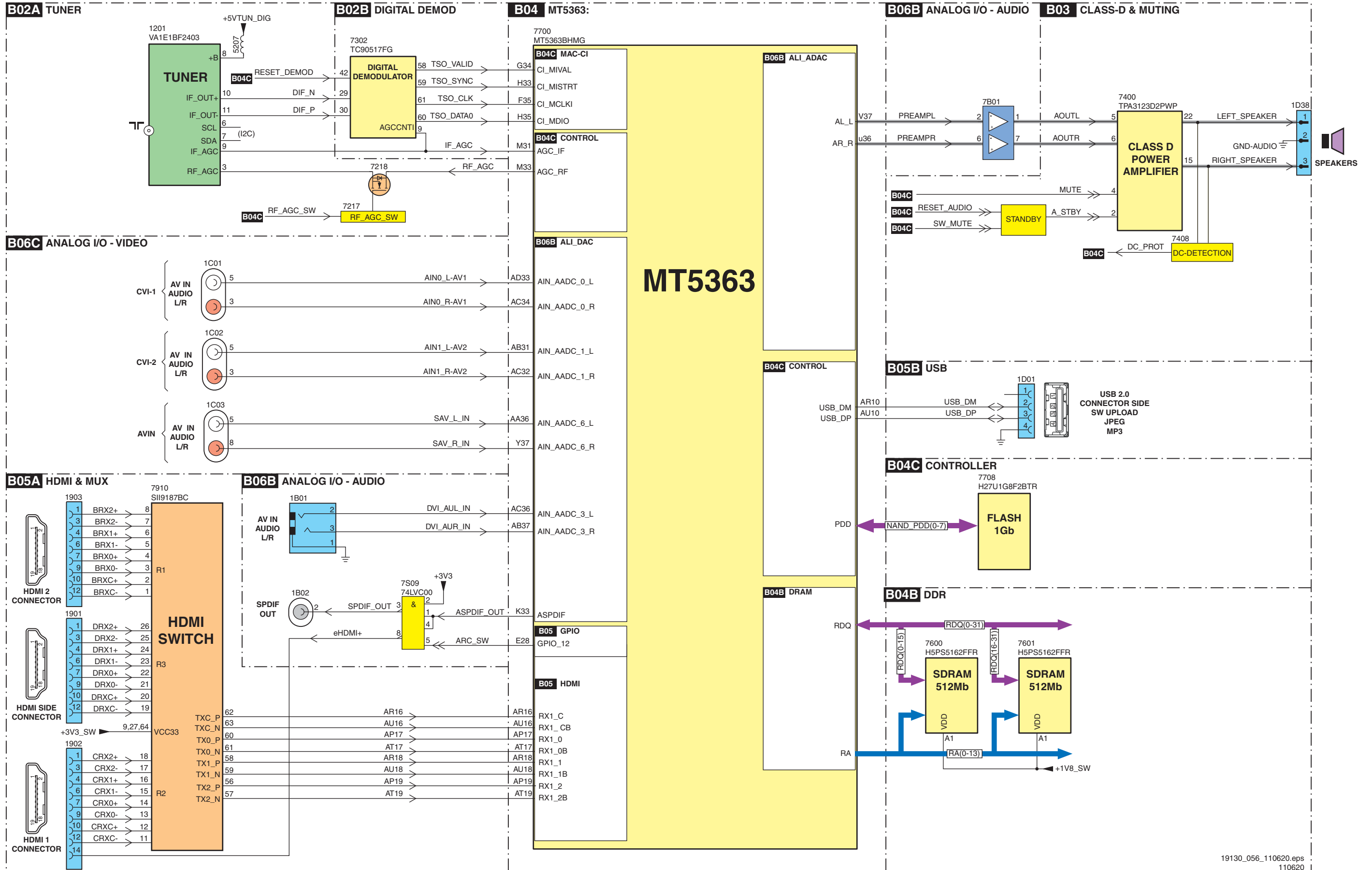
9-9 Supply Lines Overview 3939 123 65052
SUPPLY LINES OVERVIEW SSB 3139 123 6505.X



9-10 Block Diagram Video 3939 123 65231 VIDEO SSB 3139 123 6523.x

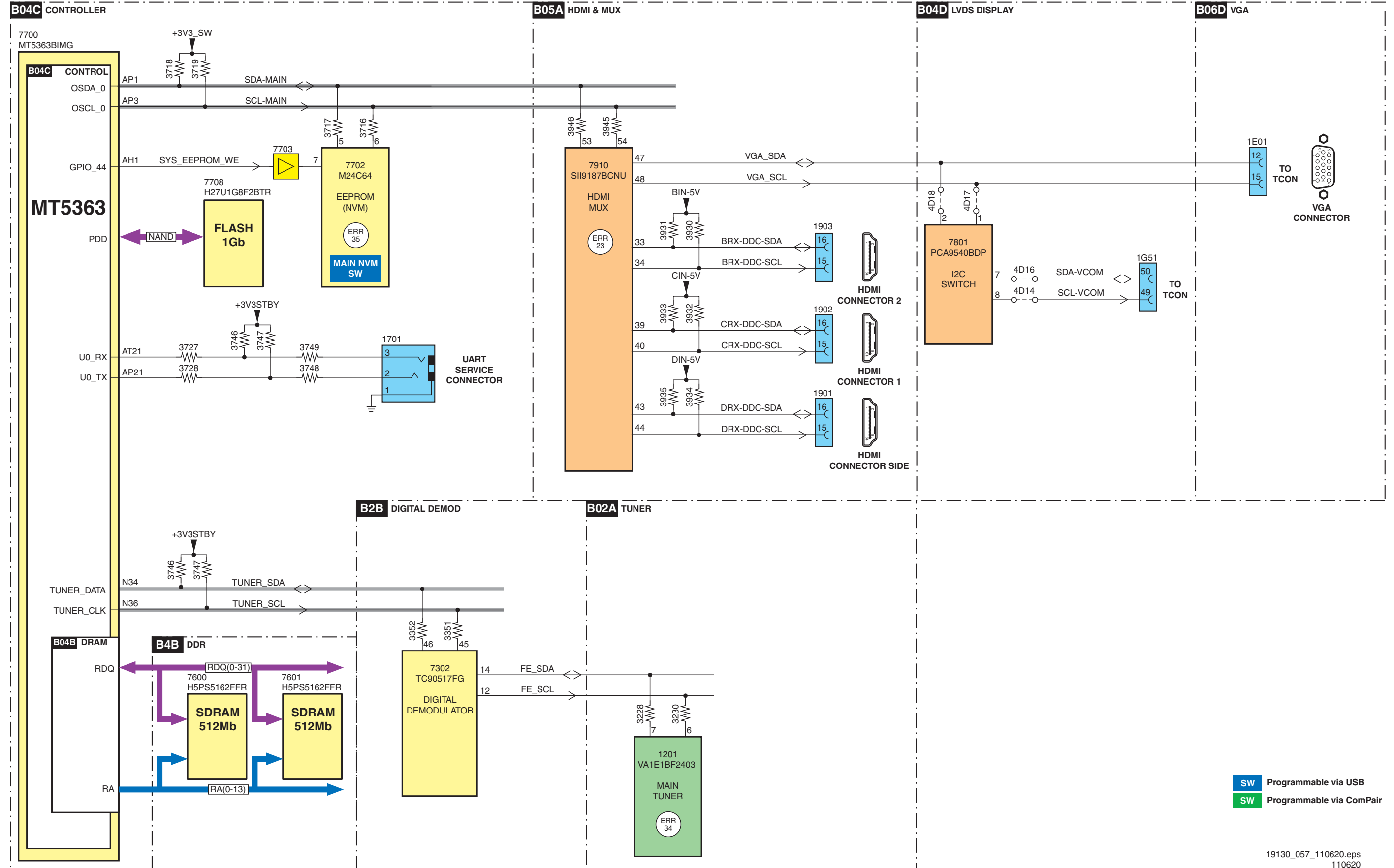


9-11 Block Diagram Audio 3939 123 65231
AUDIO SSB 3139 123 6523.x

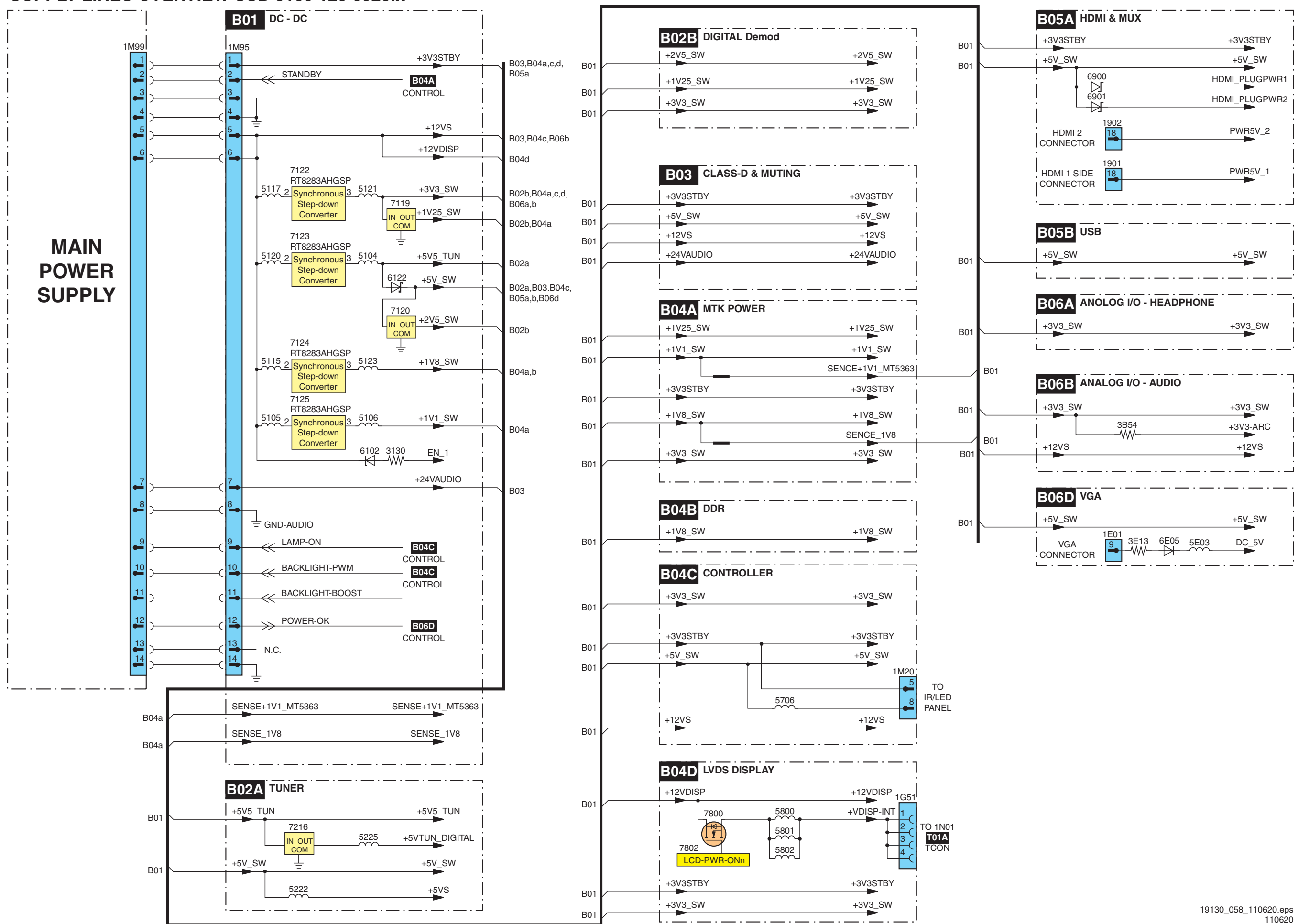


9-13 Block Diagram I²C 3939 123 65231

I²C SSB 3139 123 6523.x

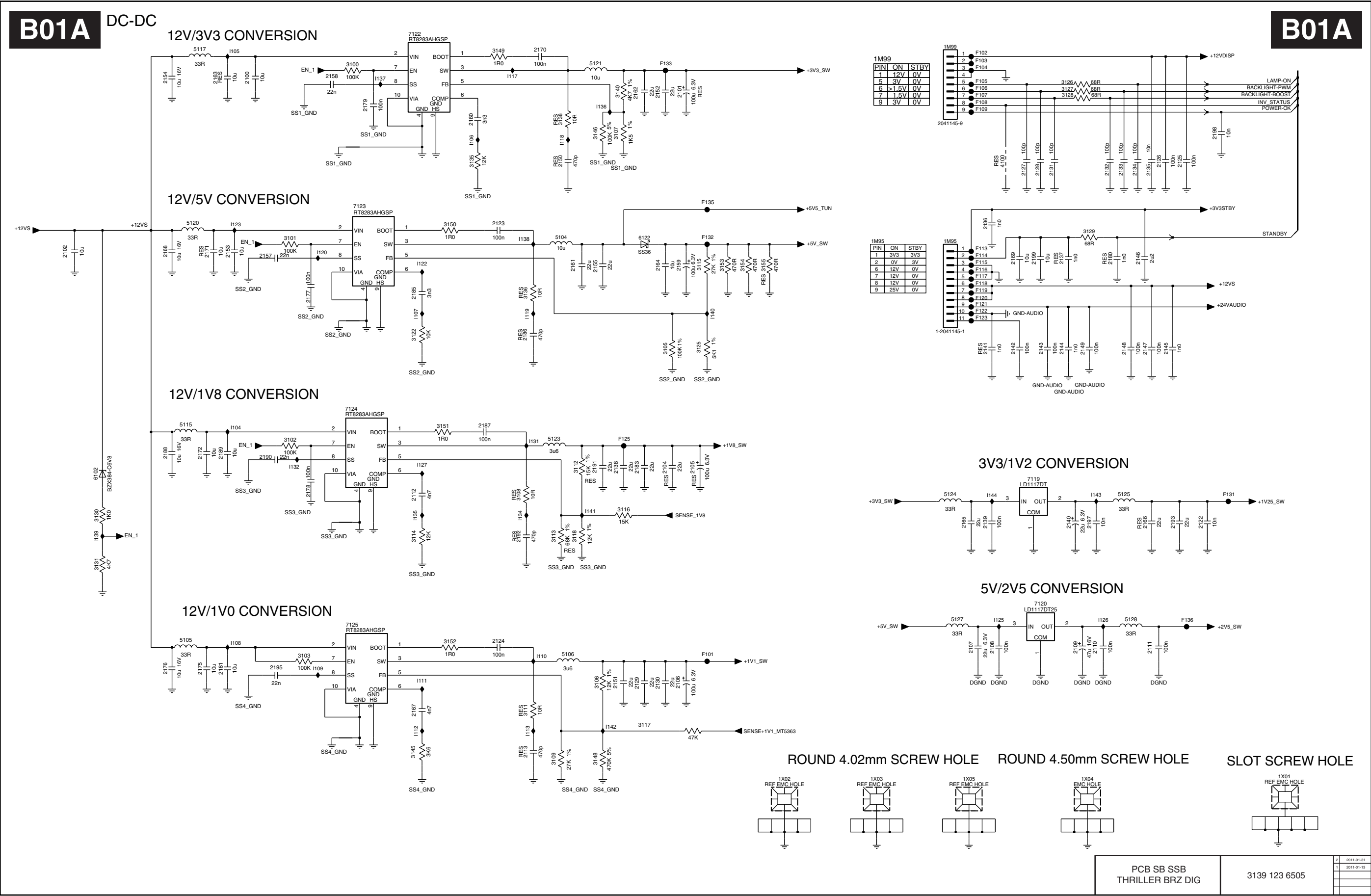


9-14 Supply Lines Overview 3939 123 65231
SUPPLY LINES OVERVIEW SSB 3139 123 6523.x



10. Circuit Diagrams and PWB Layouts

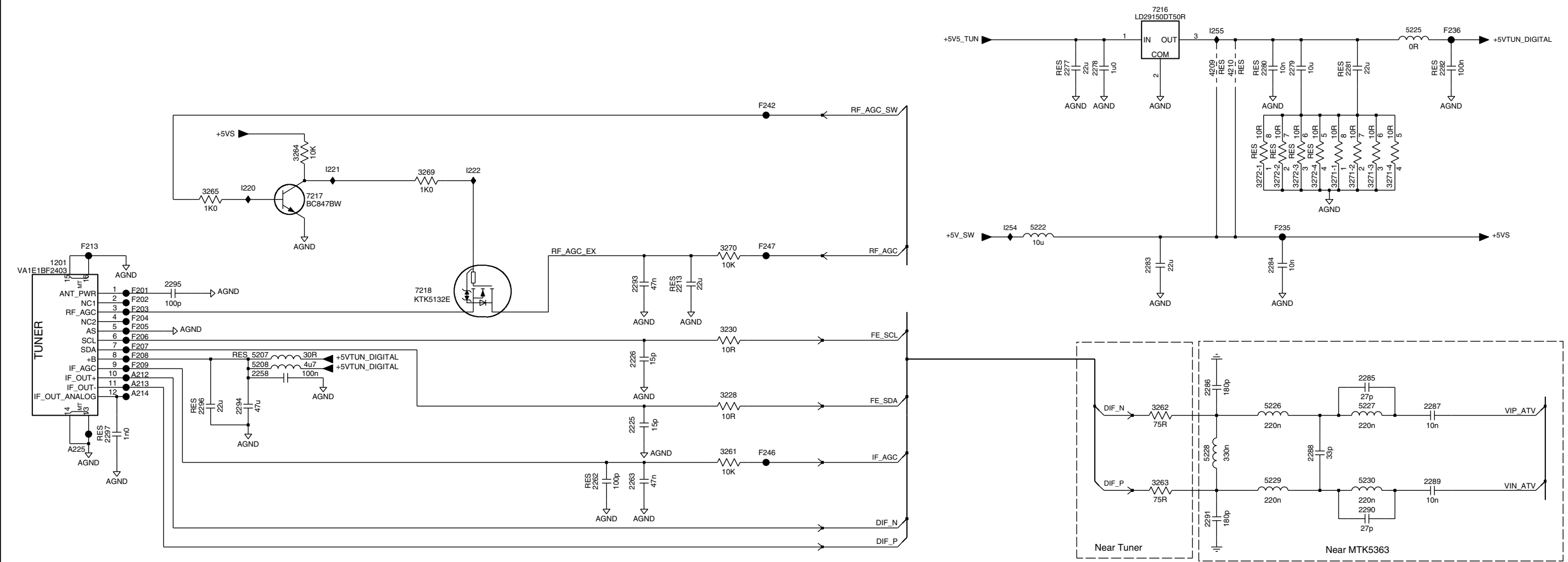
10-1 B01 313912365052
DC-DC



10-2 B02 313912365052
Tuner

B02A Tuner

B02A



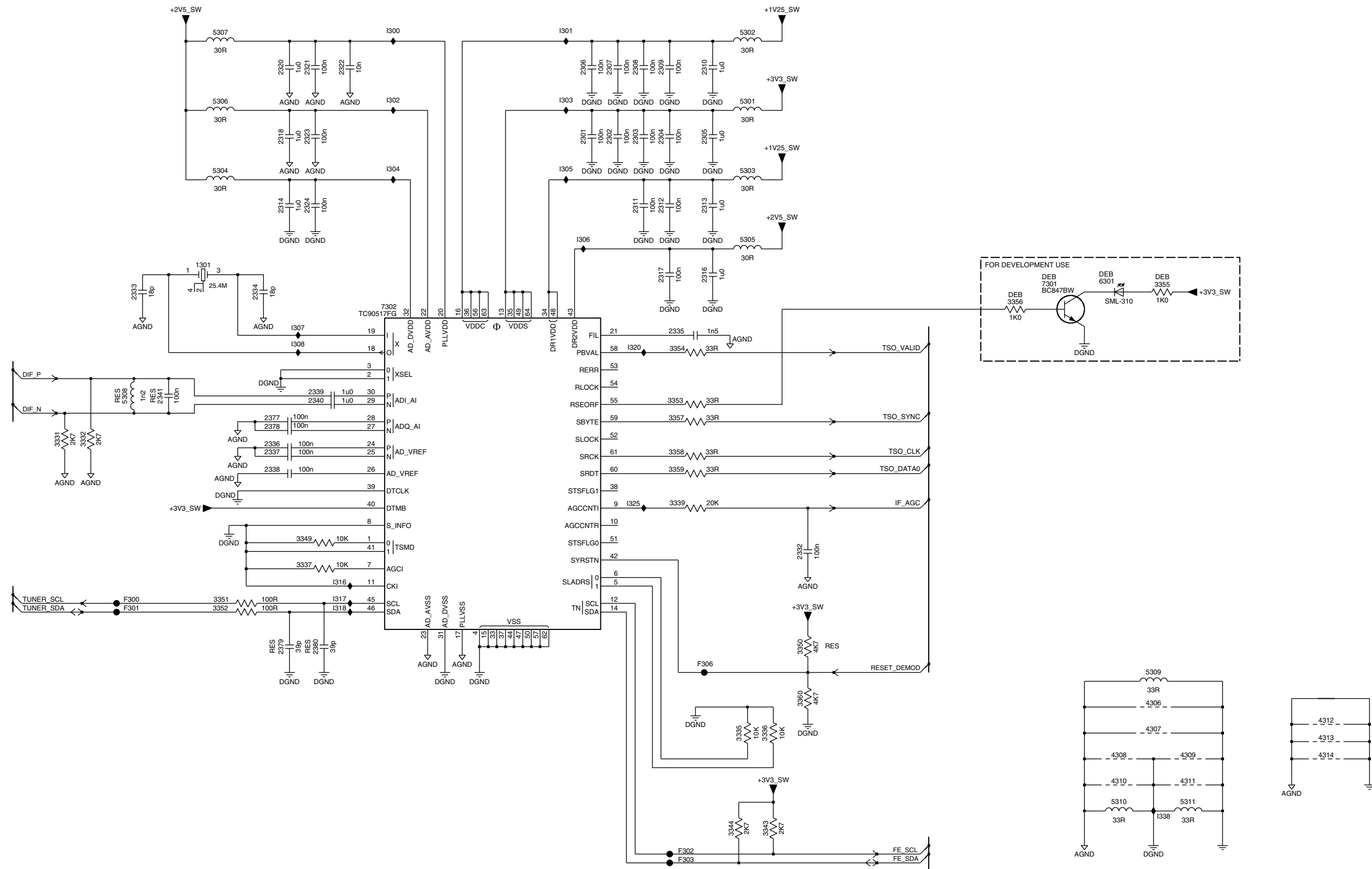
PCB SB SSB
THRILLER BRZ DIG

3139 123 6505

2	2011-01-31
1	2011-01-13

B02B Digital demodulator

B02B

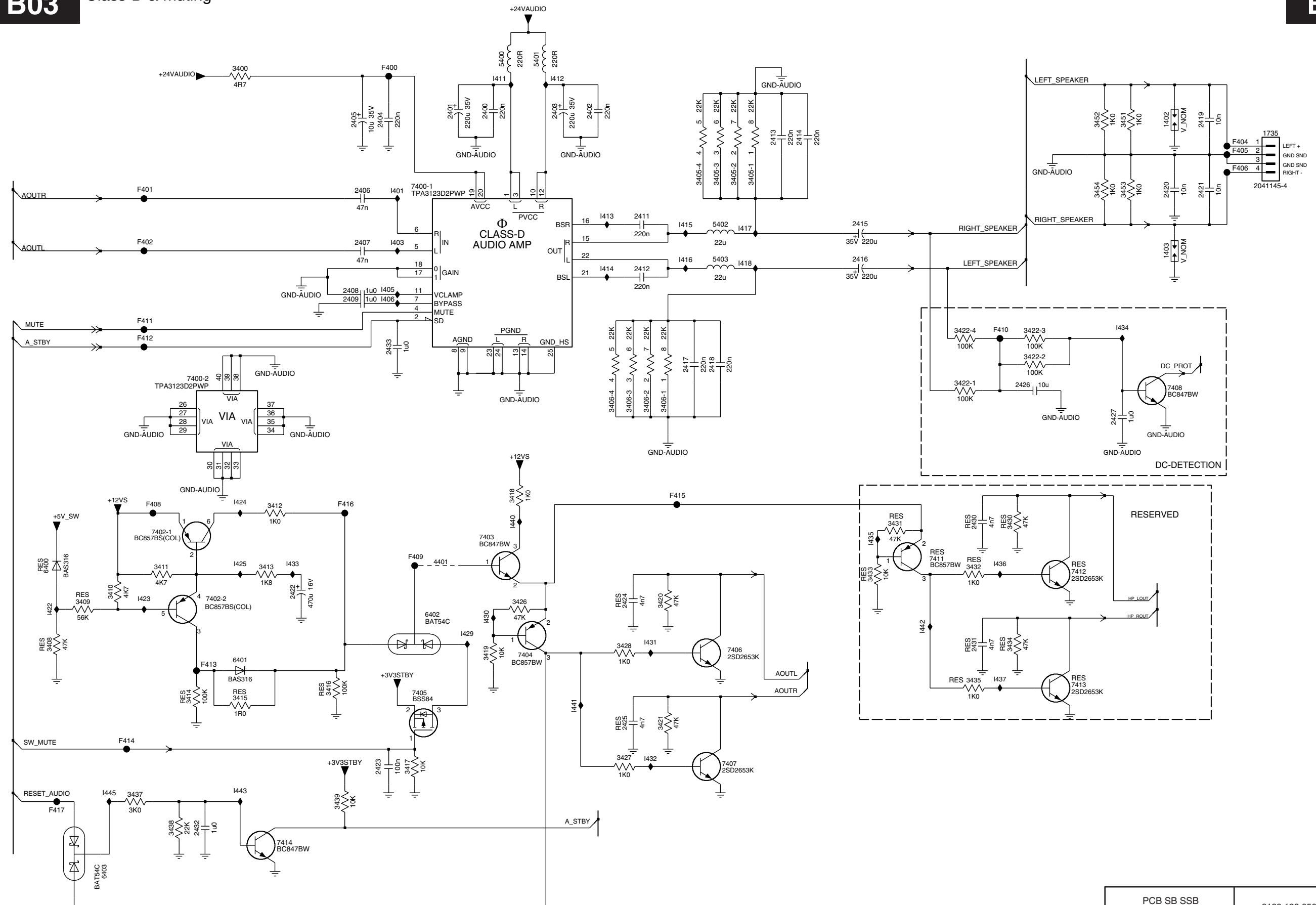


10-3 B03 313912365052

Class-D & muting

B03

Class-D & muting

B03PCB SB SSB
THRILLER BRZ DIG

3139 123 6505

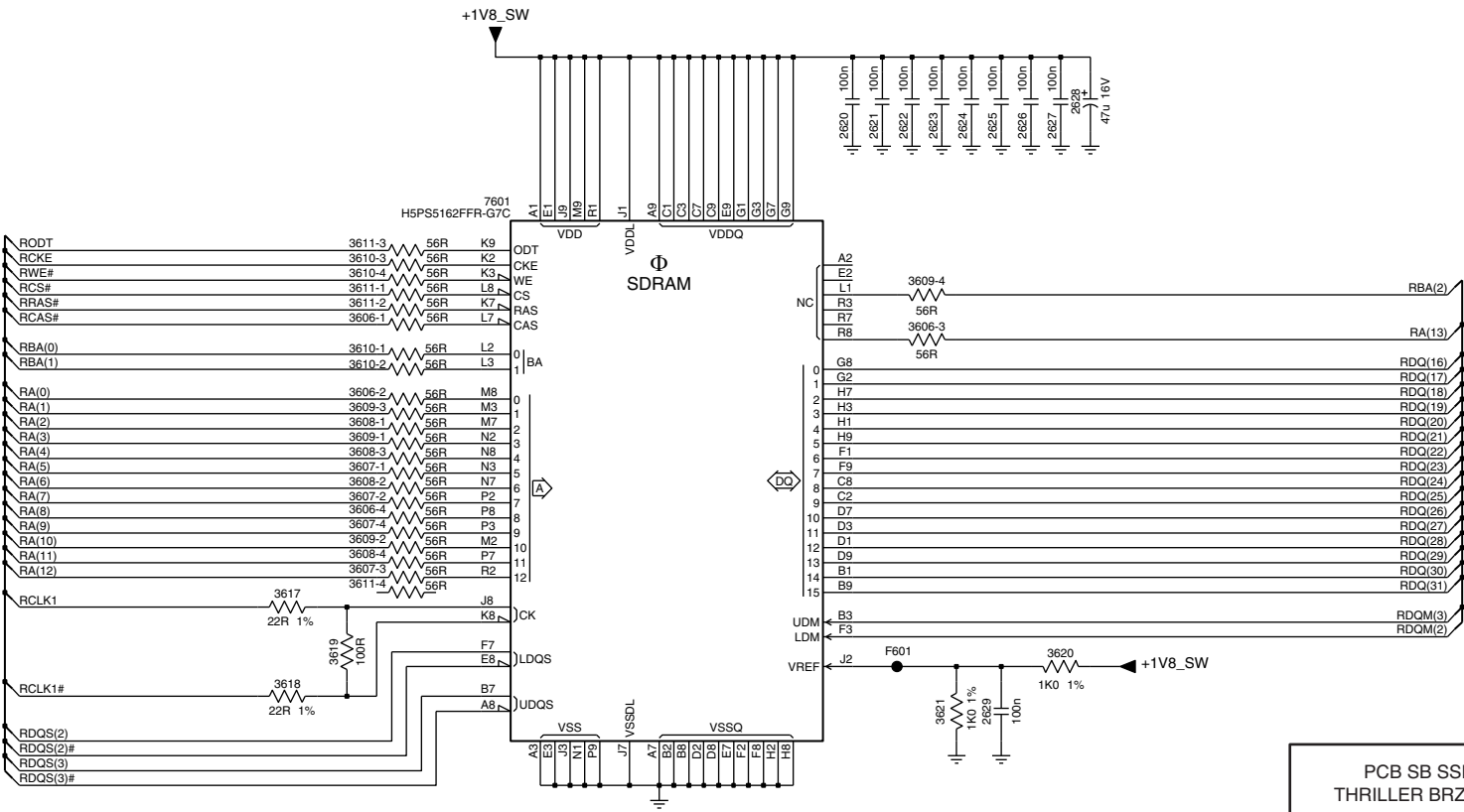
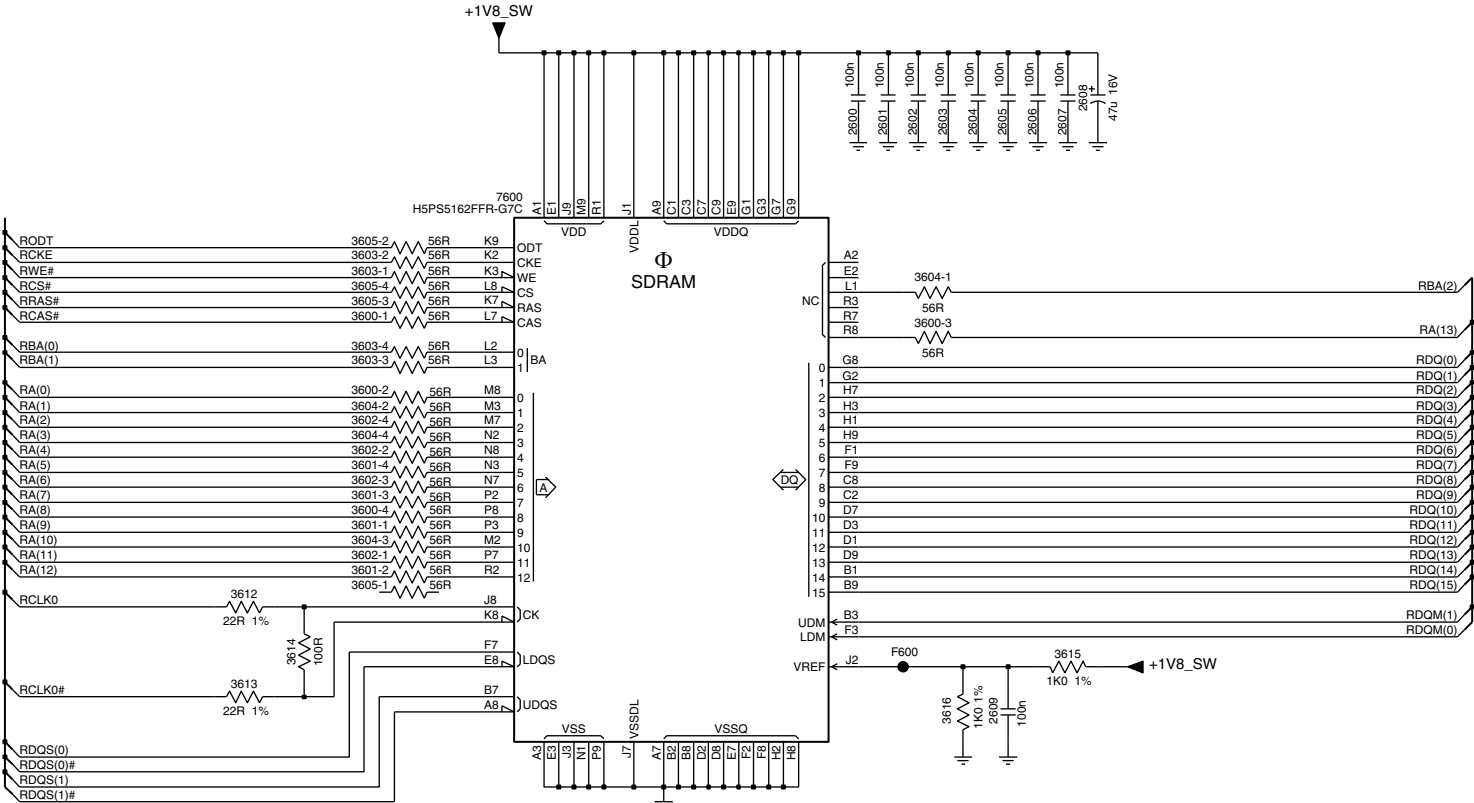
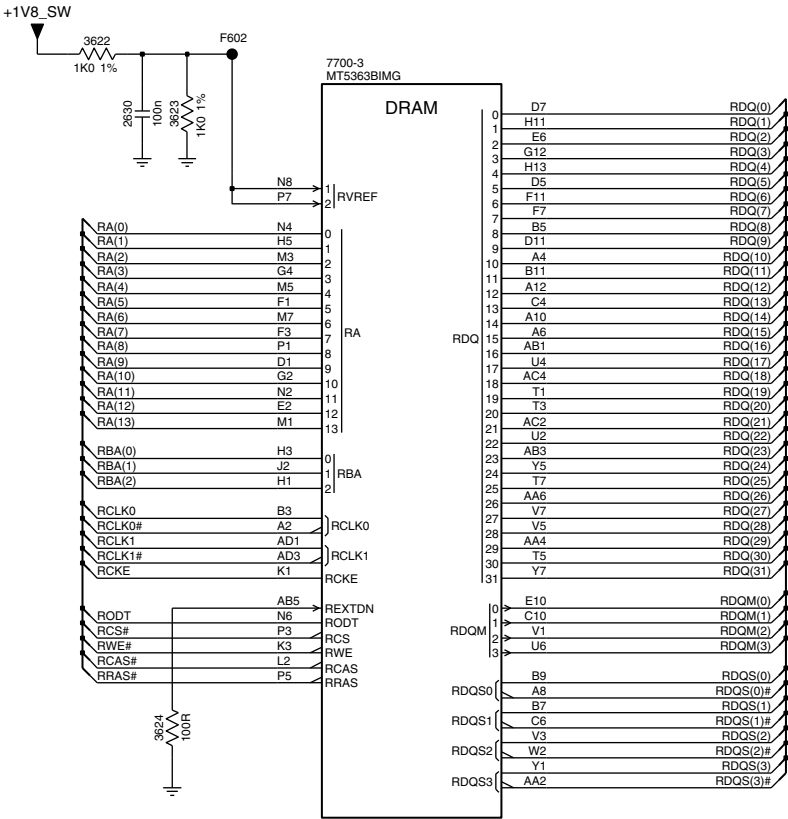
2 2011-01-31
1 2011-01-1319130_019_110427.eps
110427

DDR

B04B

DDR

B04B



PCB SB SSB
THRILLER BRZ DIG

3139 123 6505

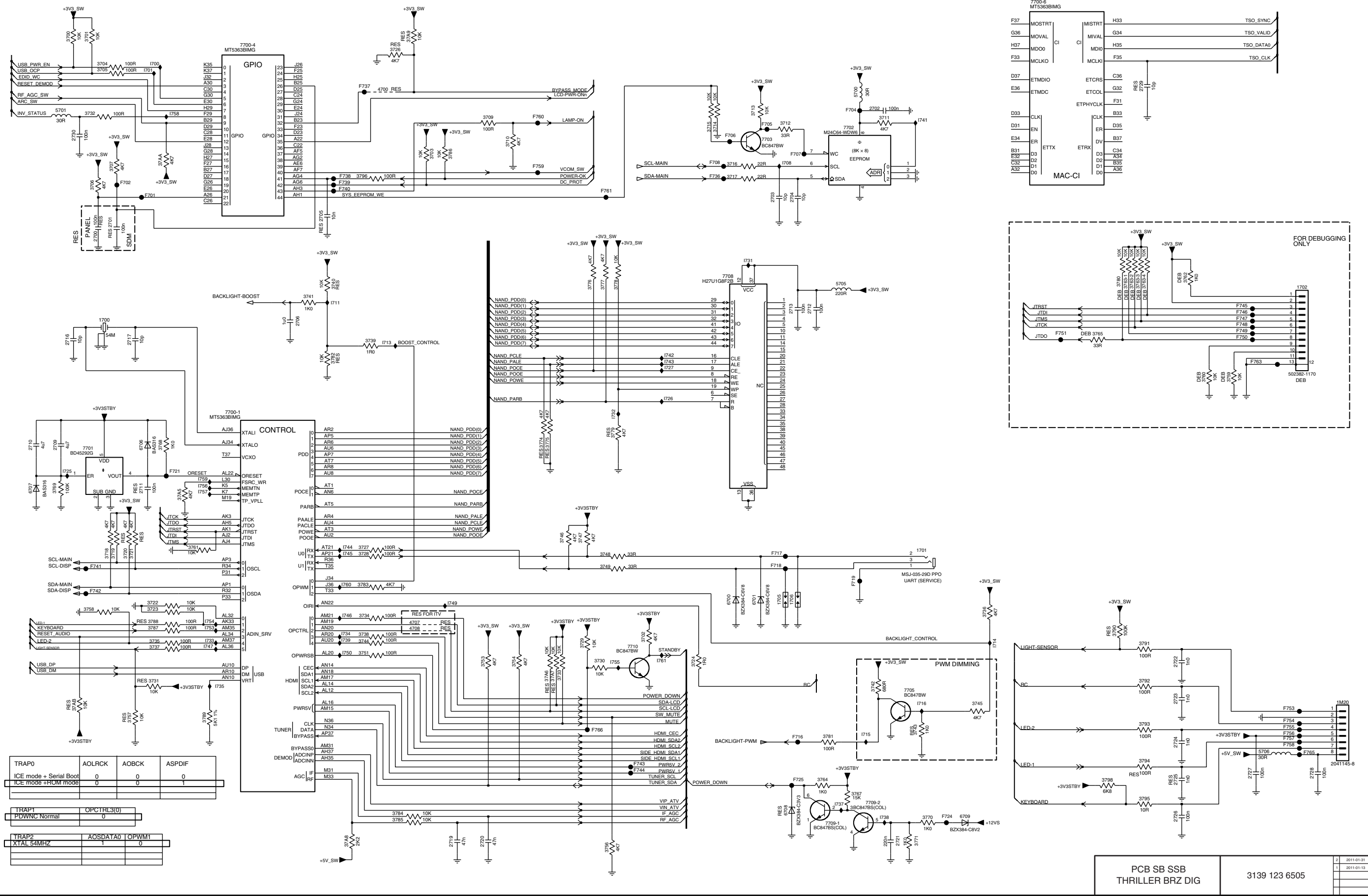
2	2011-01-31
1	2011-01-13

Controller

B04C

Controller

B04C



PCB SB SSB
THRILLER BRZ DIG

3139 123 6505

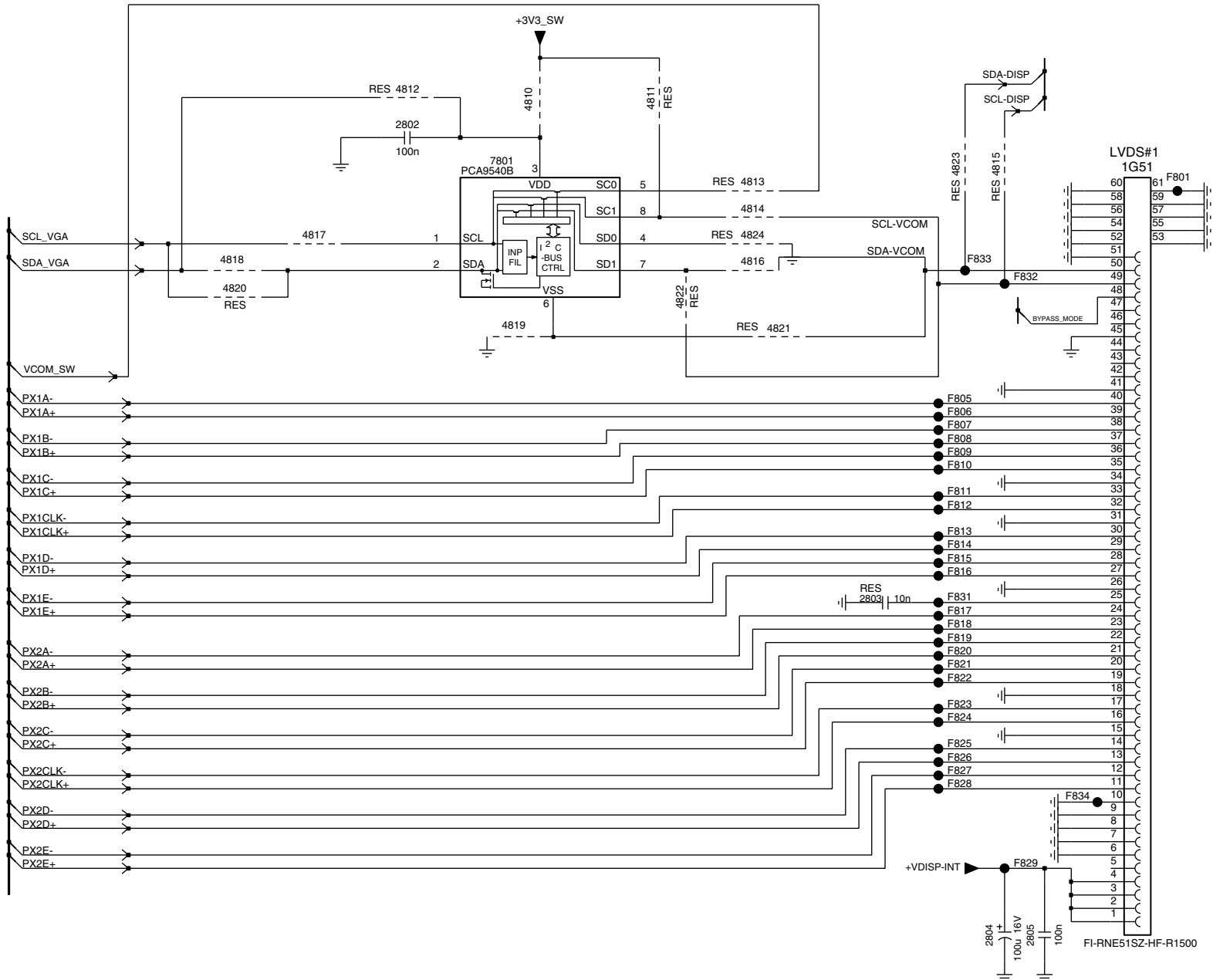
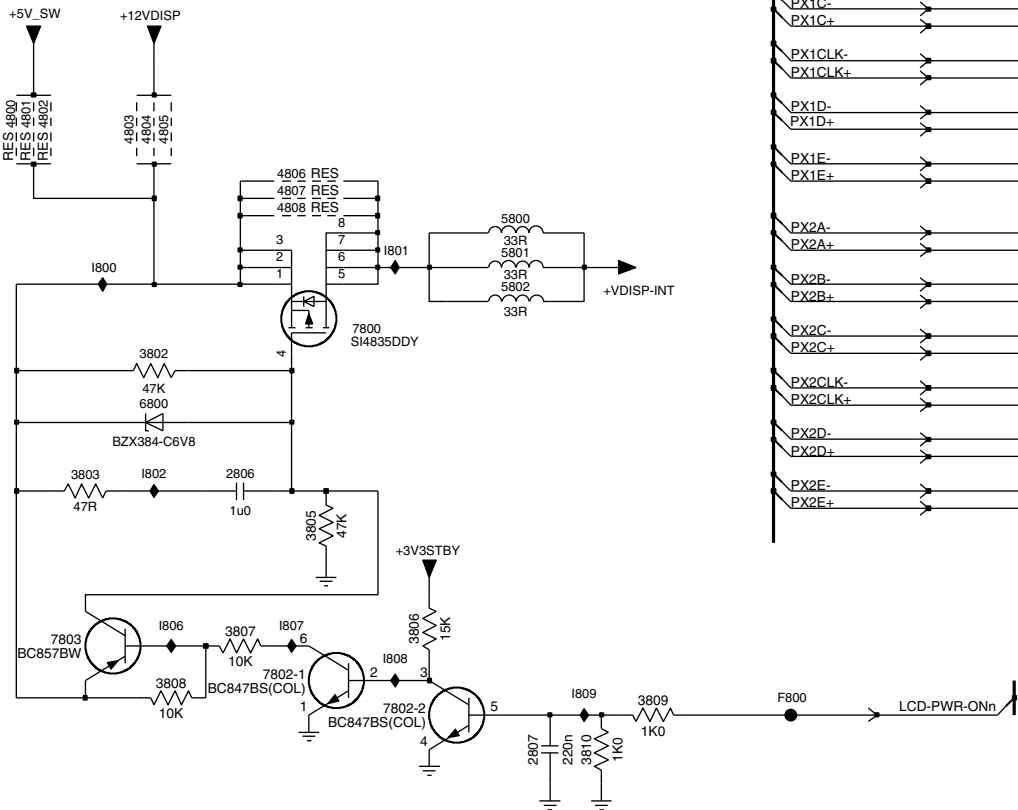
LVDS Display

B04D

LVDS Display

B04D

	PCA5940	PCA9515 - (RES)
4810	Y	-
4814	Y	-
4816	Y	-
4817	Y	-
4818	Y	-
4819	Y	-
4820	-	Y
4812	-	Y
4815	-	Y
4813	-	Y
4821	-	Y
4822	-	Y
4811	-	Y



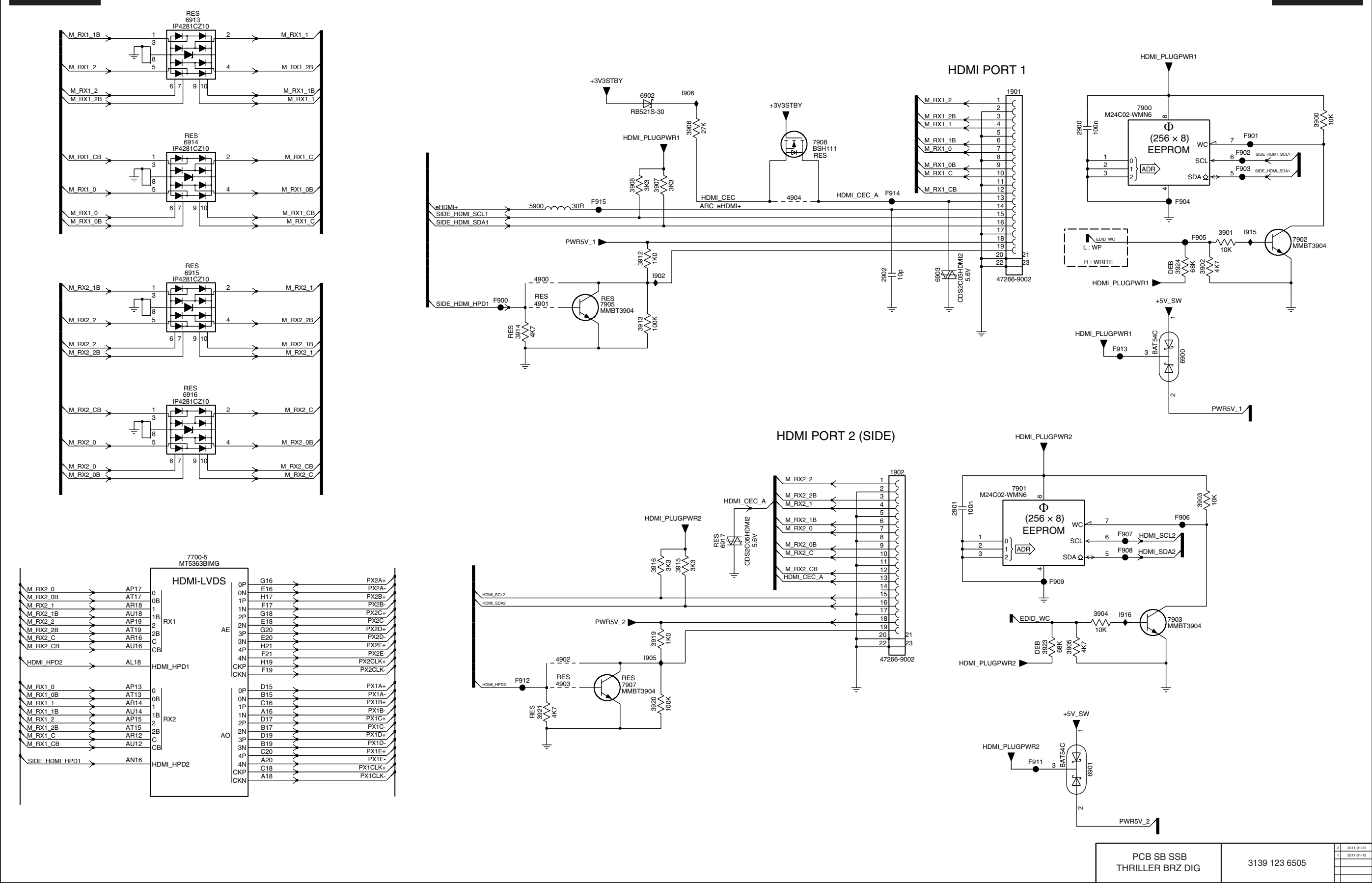
10-5 B05 313912365052

HDMI & Multiplexer

B05A

HDMI & Multiplexer

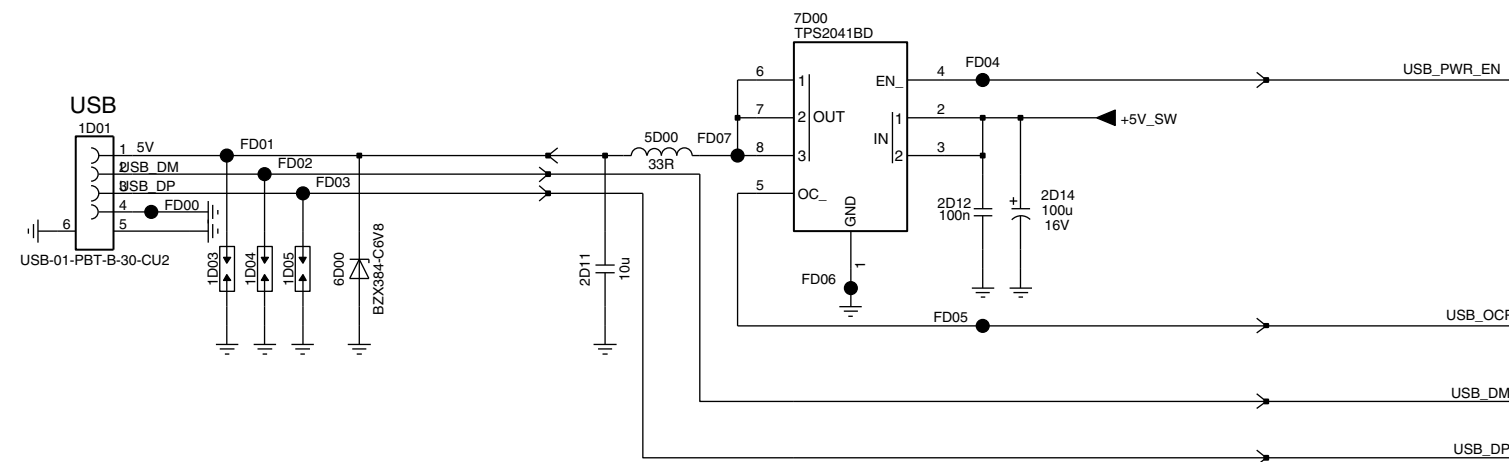
B05A



PCB SB SSB THRILLER BRZ DIG	3139 123 6505	2	2011-01-31
		1	2011-01-13

B05B USB

B05B



PCB SB SSB THRILLER BRZ DIG	3139 123 6505	2	2011-01-31
		1	2011-01-13

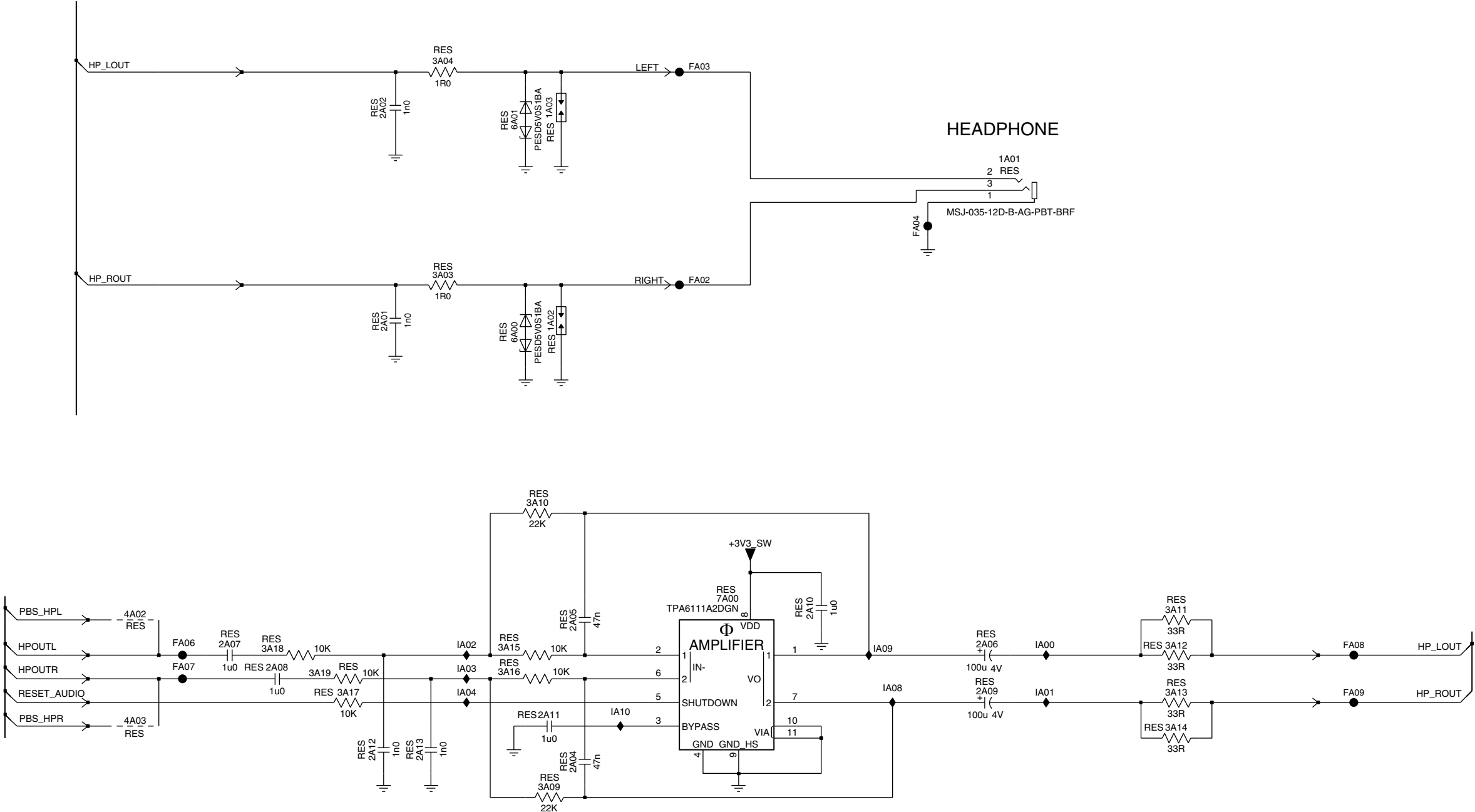
10-6 B06 313912365052
Analog I/O - Headphone

B06A

Analog I/O - Headphone

B06A

RESERVED



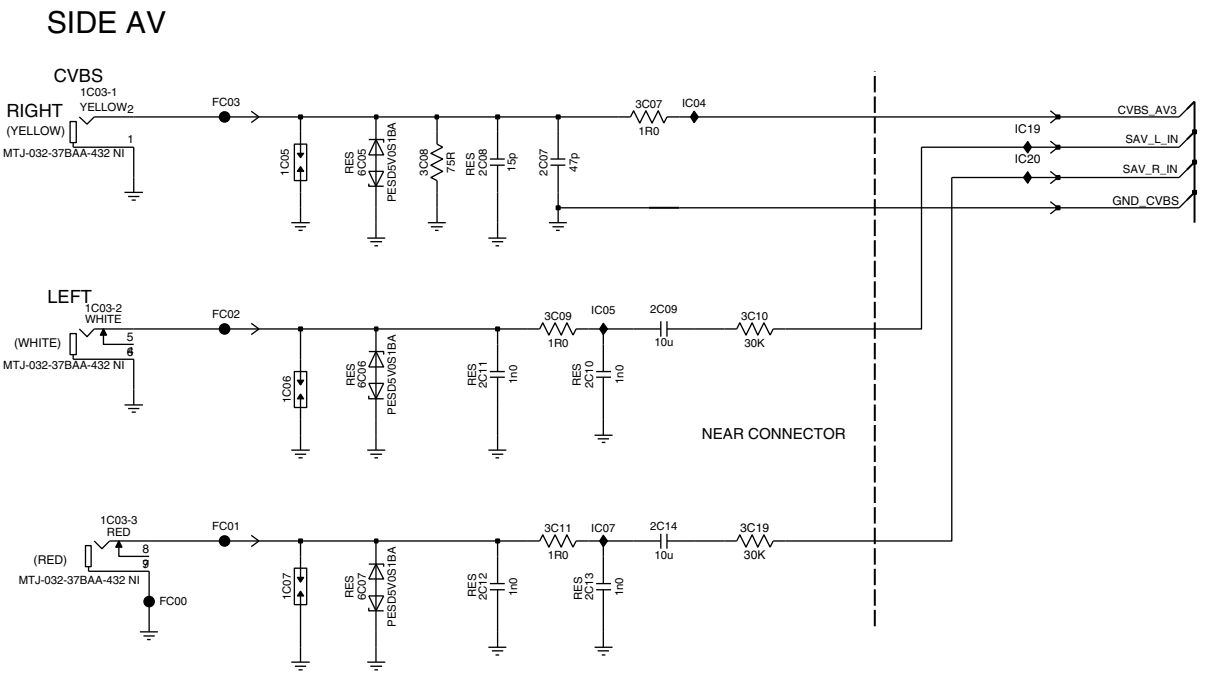
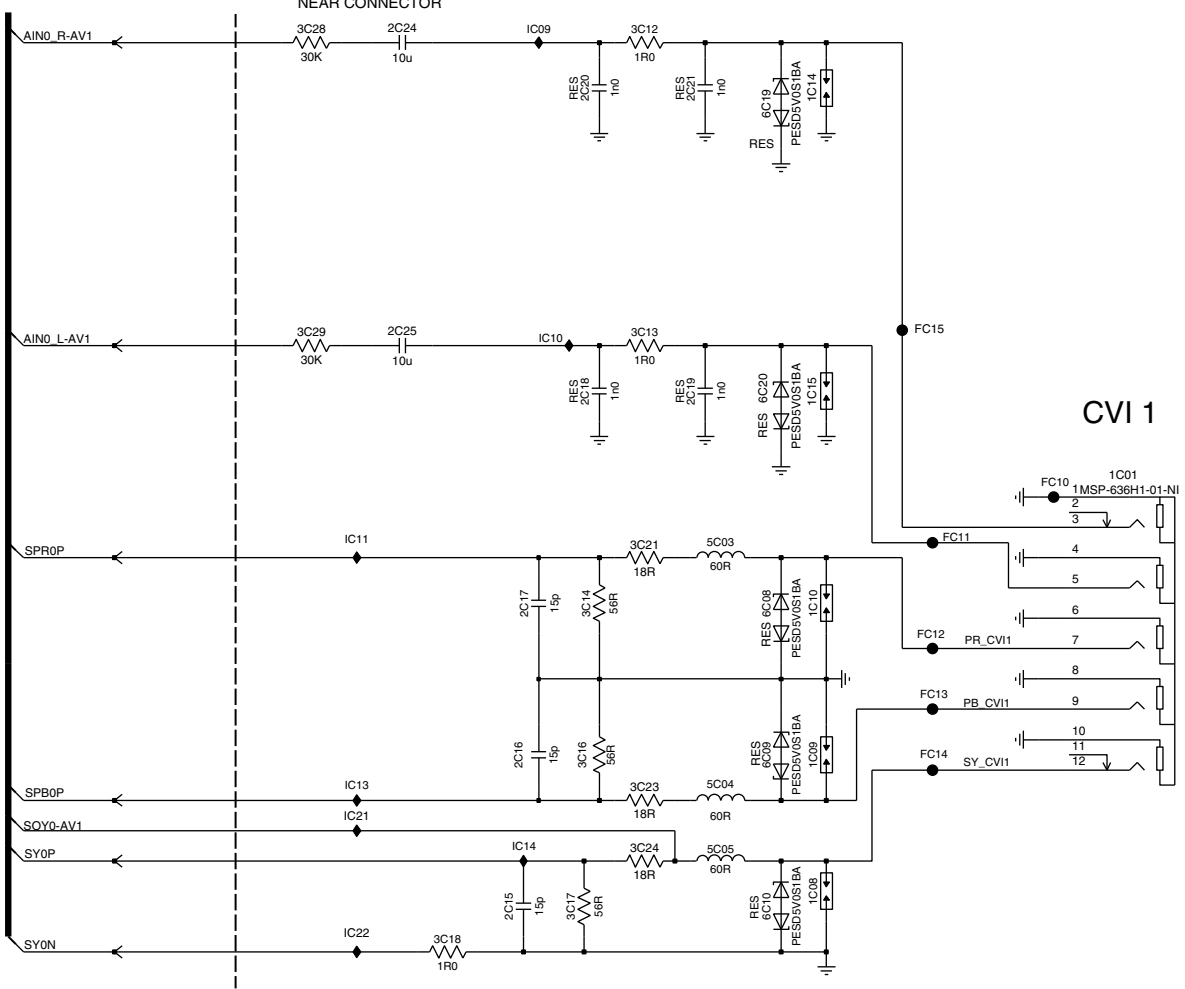
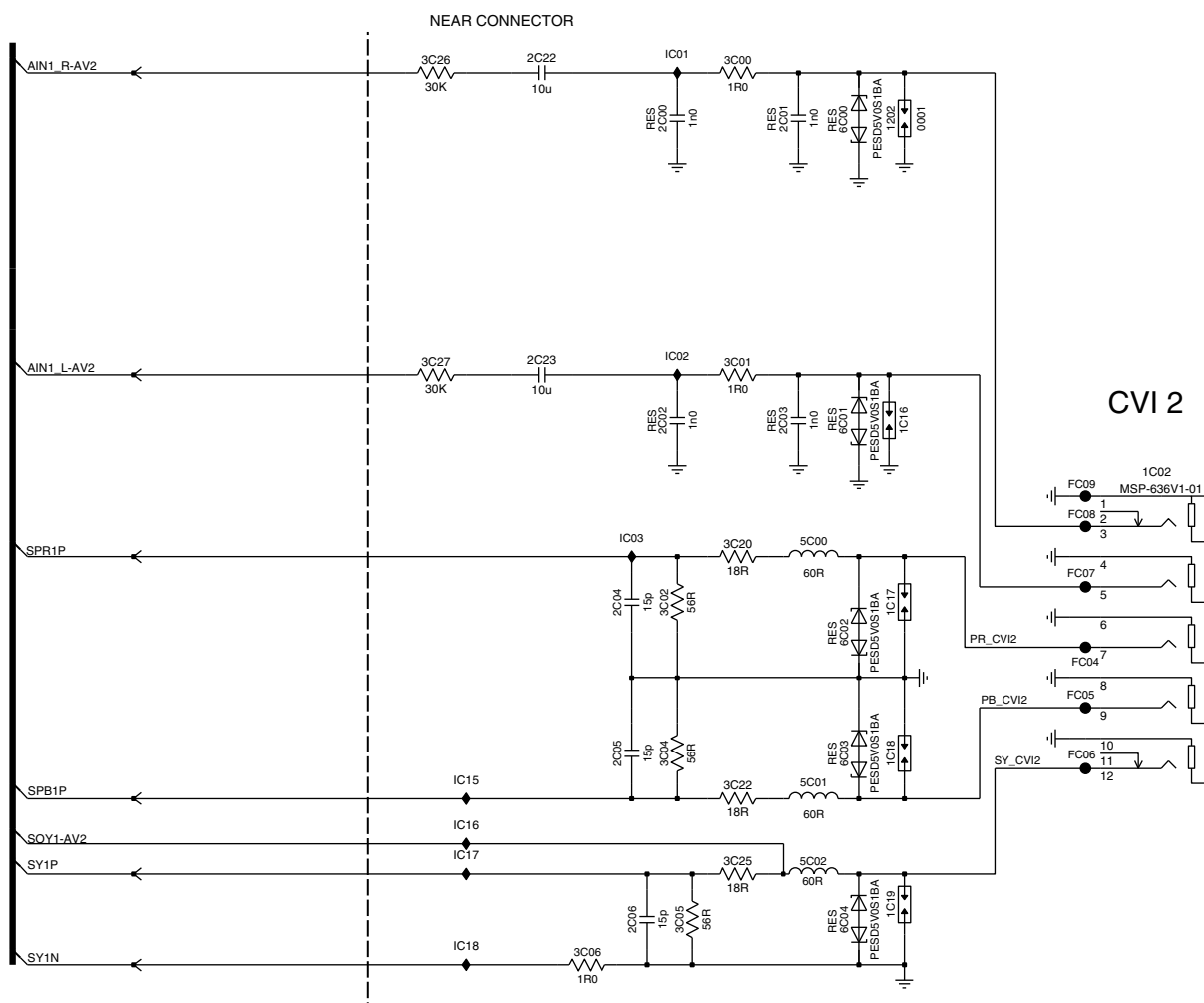
PCB SB SSB THRILLER BRZ DIG	3139 123 6505	2	2011-01-31
		1	2011-01-13

Analog I/O - Video

B06C

Analog I/O - Video

B06C



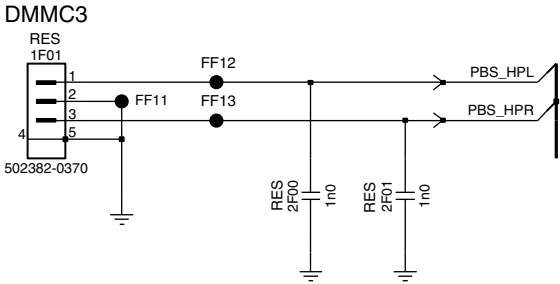
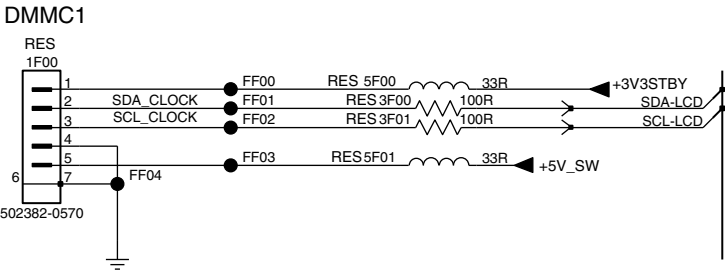
PCB SB SSB THRILLER BRZ DIG	3139 123 6505	2	2011-01-31
		1	2011-01-13

10-7 B07 313912365052
Hospitality

B07

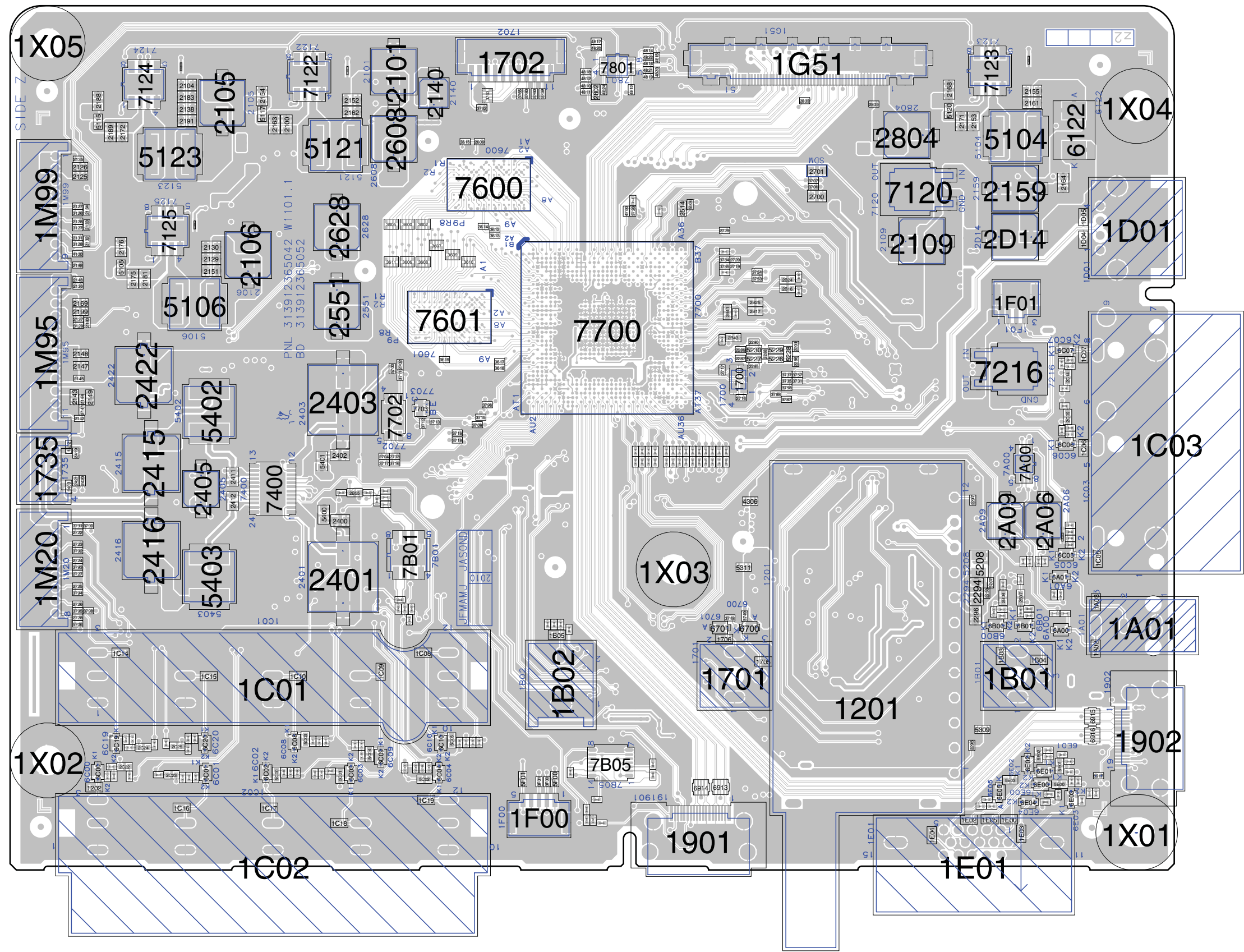
Hospitality

B07



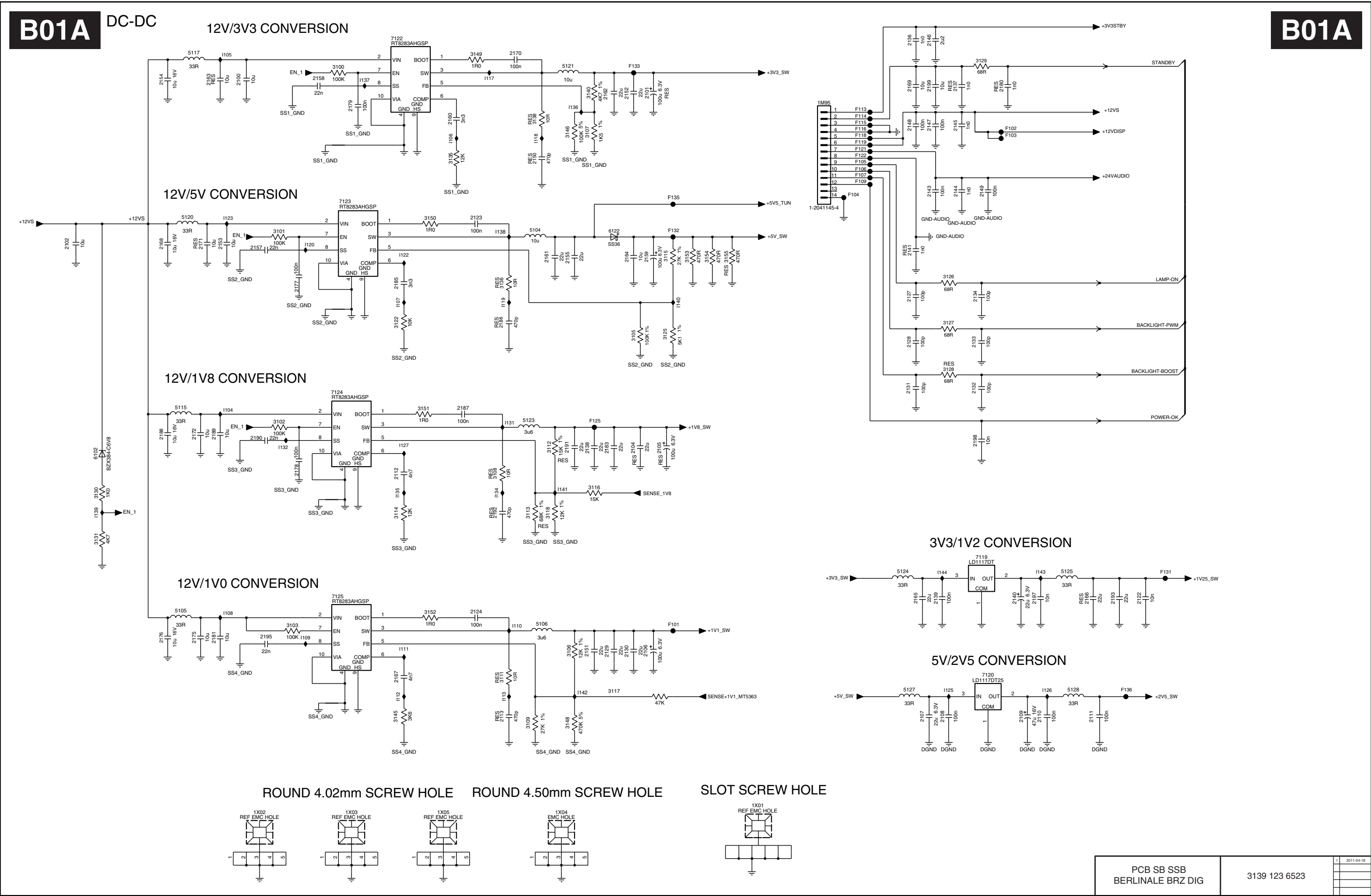
PCB SB SSB THRILLER BRZ DIG	3139 123 6505	2	2011-01-31
		1	2011-01-13

10-8 313912365052 SSB Layout
Overview top side

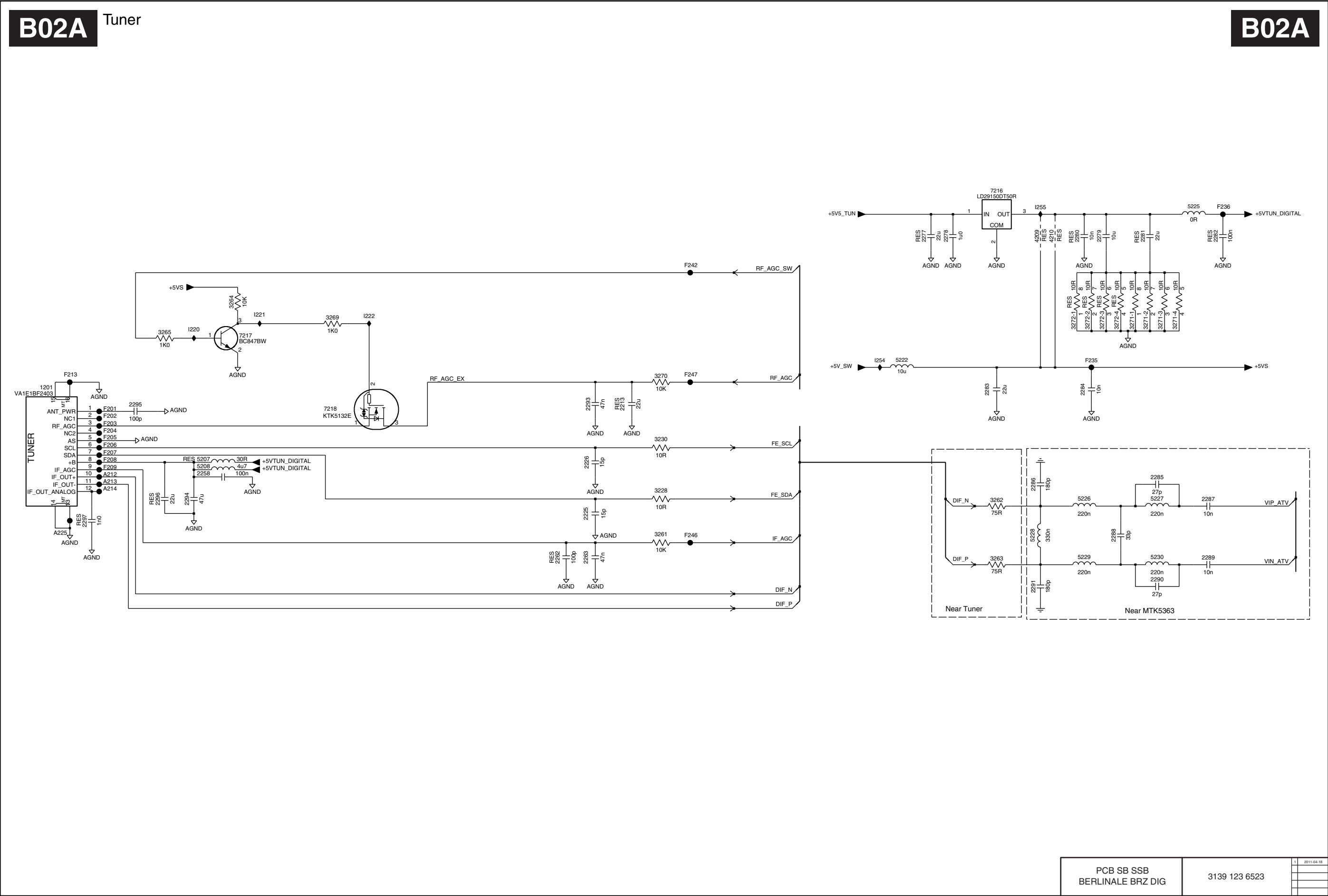


SSB Layout Top	3139 123 6505	2	2011-01-31

10-9 B01 313912365231
DC-DC



10-10 B02 313912365231
Tuner



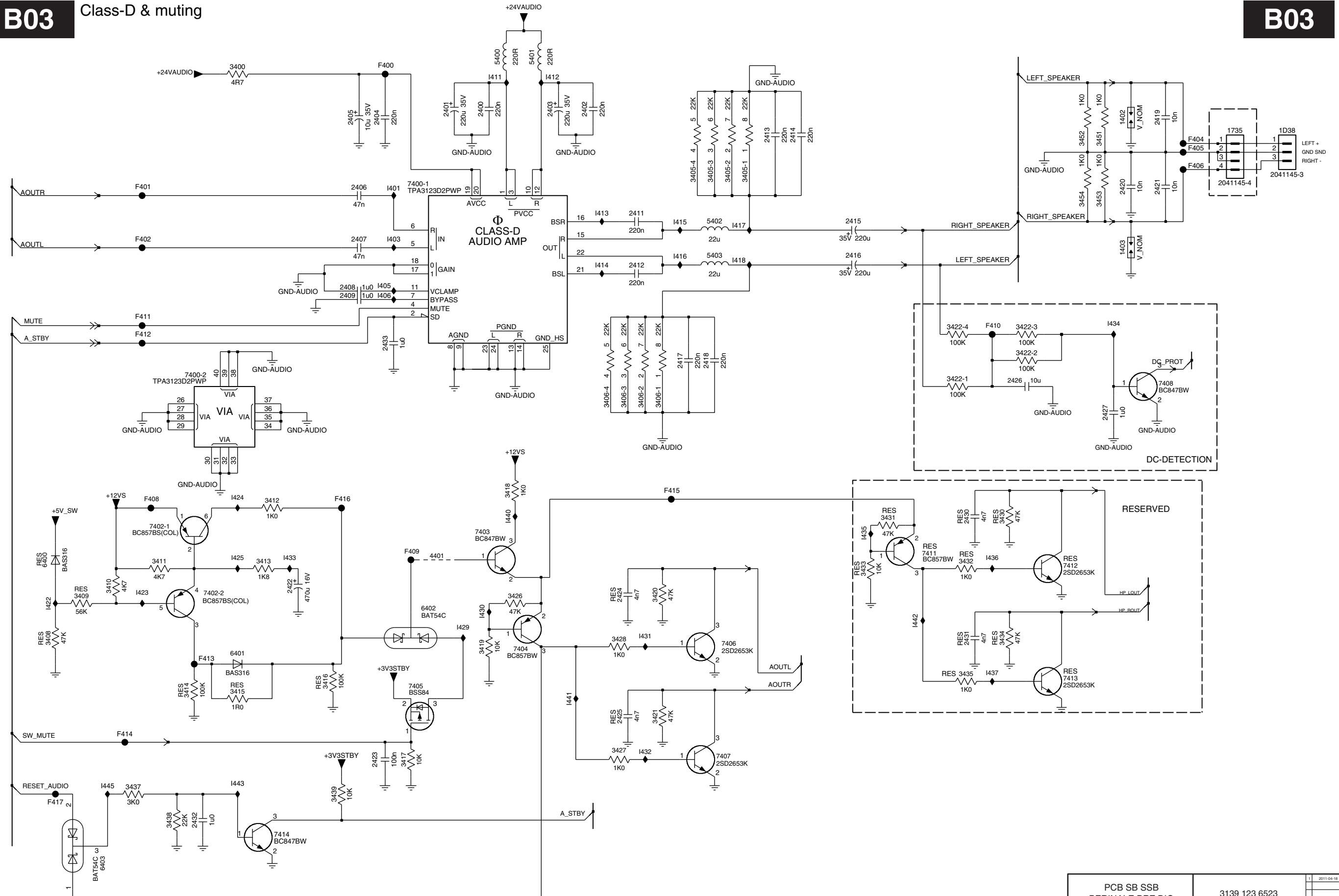
PCB SB SSB BERLINALE BRZ DIG	3139 123 6523	1	2011-04-18

10-11 B03 313912365231

Class-D & muting

B03

Class-D & muting

B03PCB SB SSB
BERINALE BRZ DIG

3139 123 6523

1
2011-04-1819131_004_110615.eps
110615

MT5363 Power

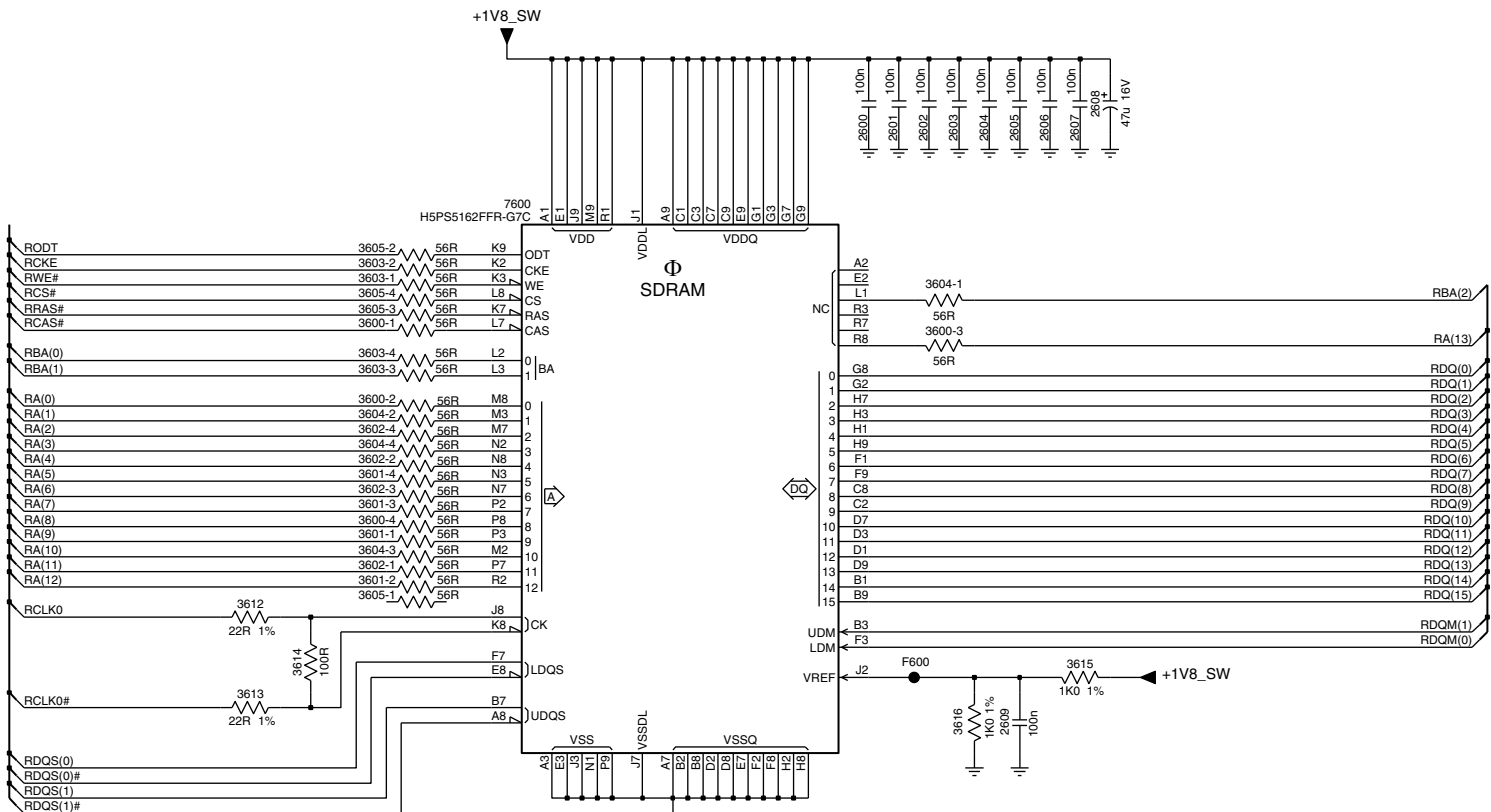
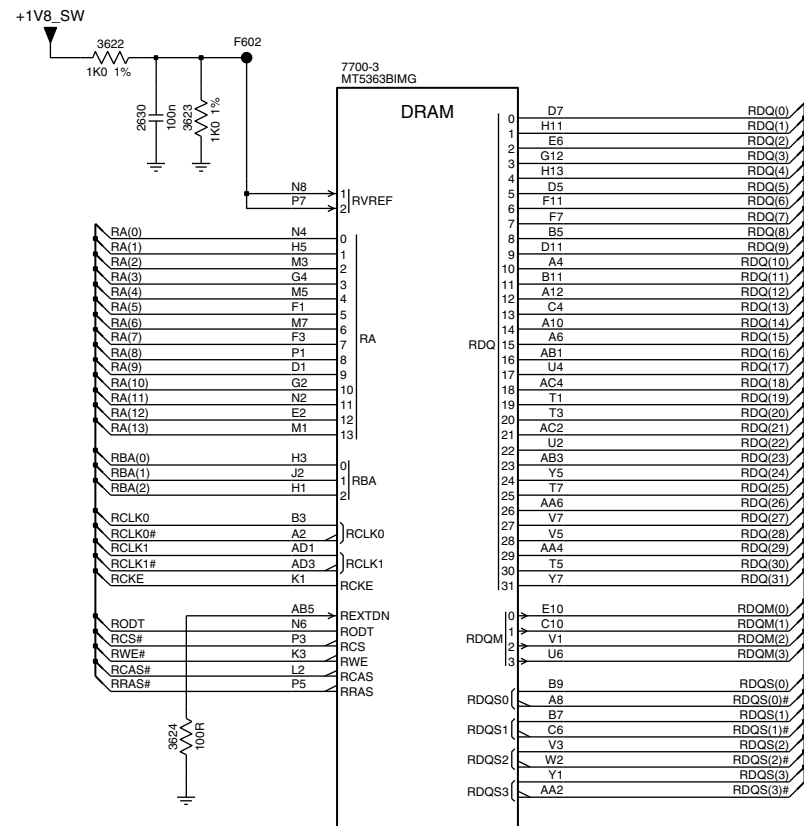


DDR

B04B

DDR

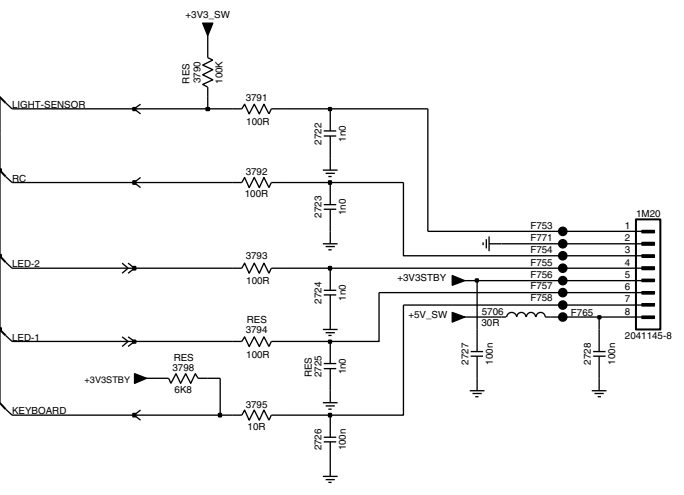
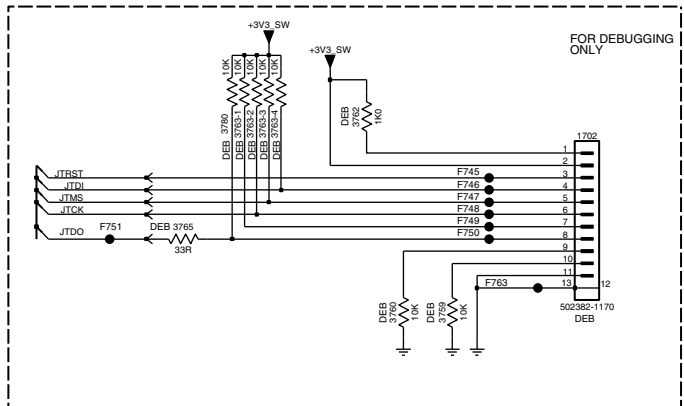
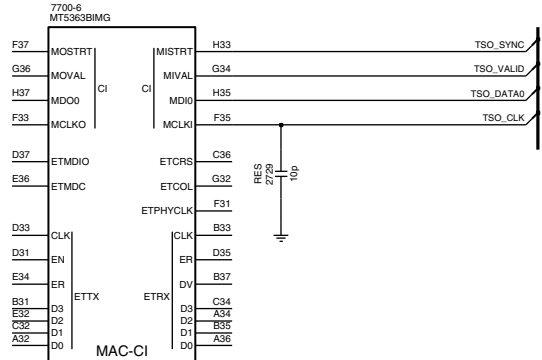
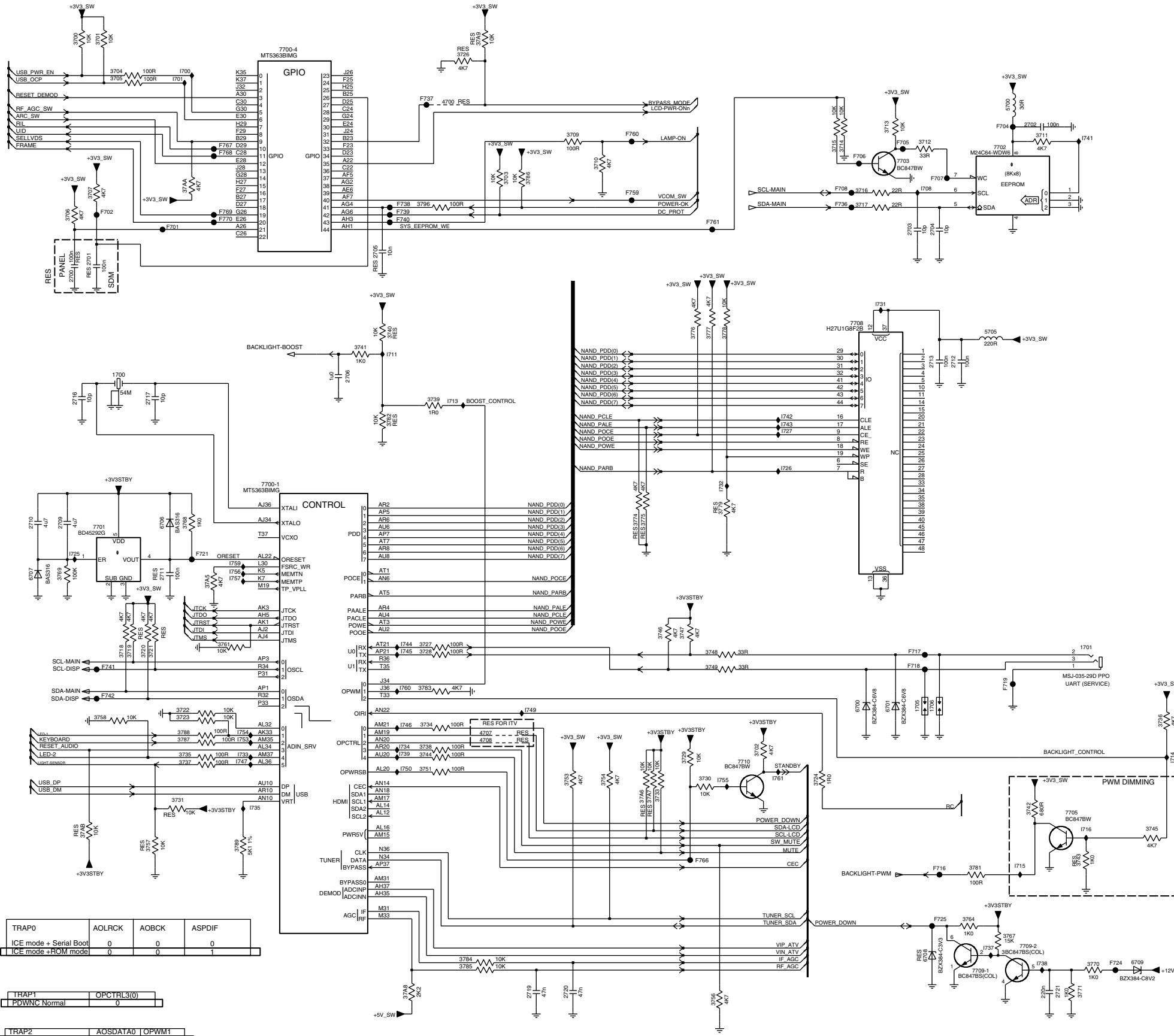
B04B



Controller

B04C Controller

B04C



PCB SB SSB BERLINALE BRZ DIG	3139 123 6523
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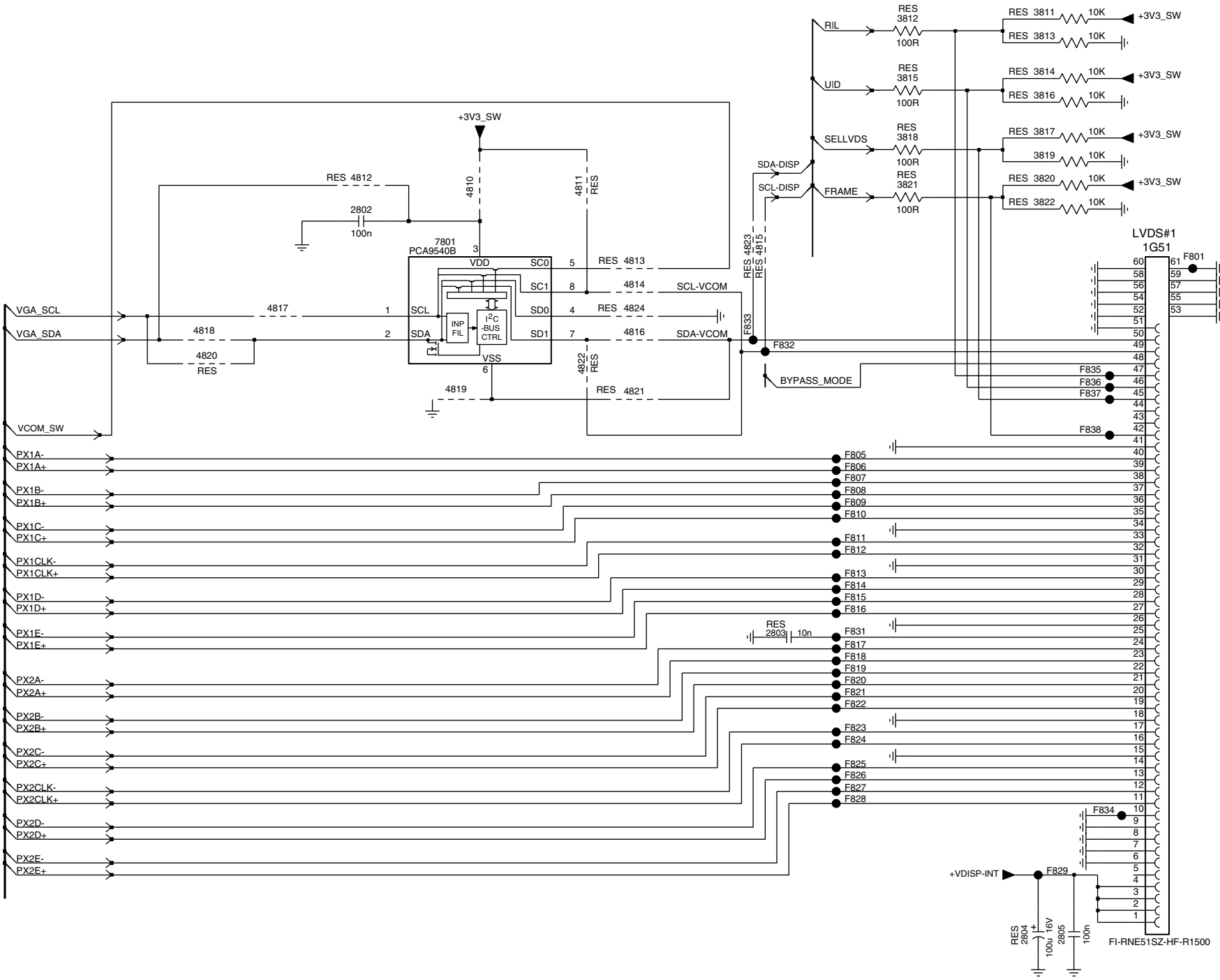
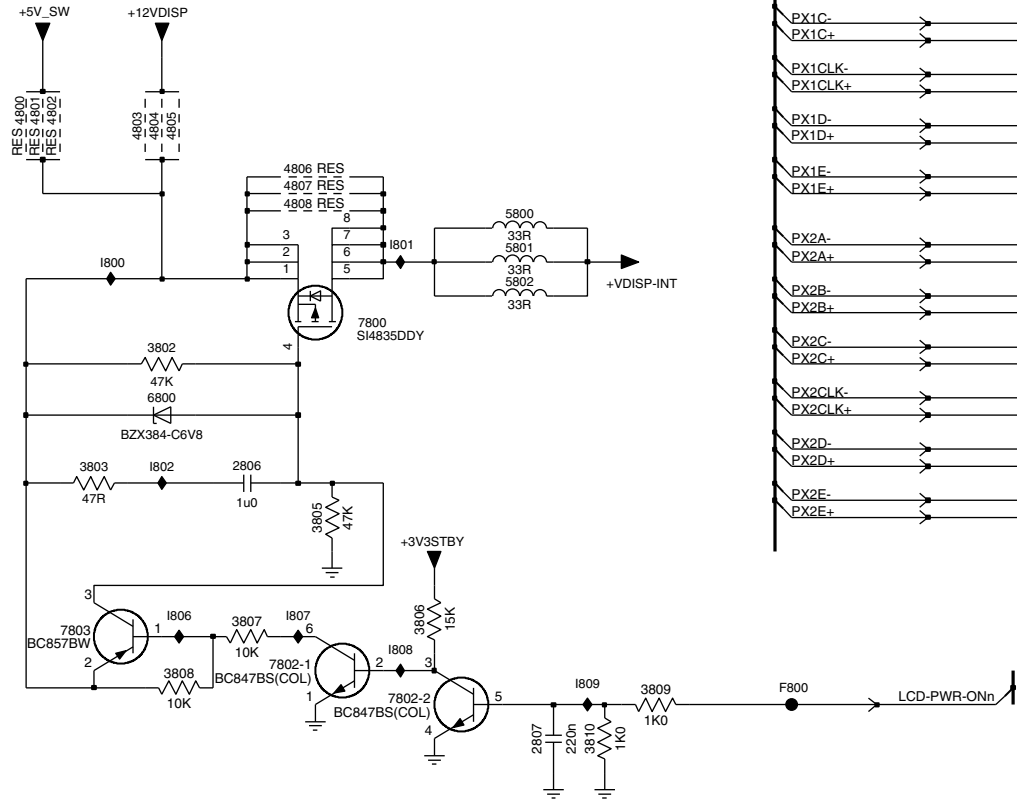
LVDS Display

B04D

LVDS Display

B04D

	PCA5940	PCA9515 - (RES)
4810	Y	-
4814	Y	-
4816	Y	-
4817	Y	-
4818	Y	-
4819	Y	-
4820	-	Y
4812	-	Y
4815	-	Y
4813	-	Y
4821	-	Y
4822	-	Y
4811	-	Y



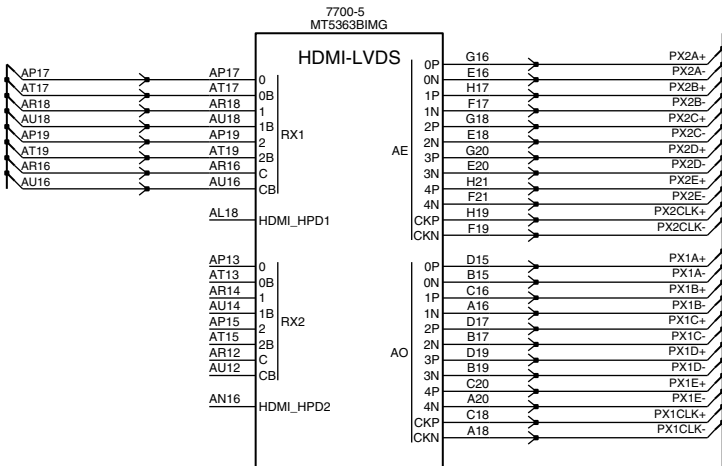
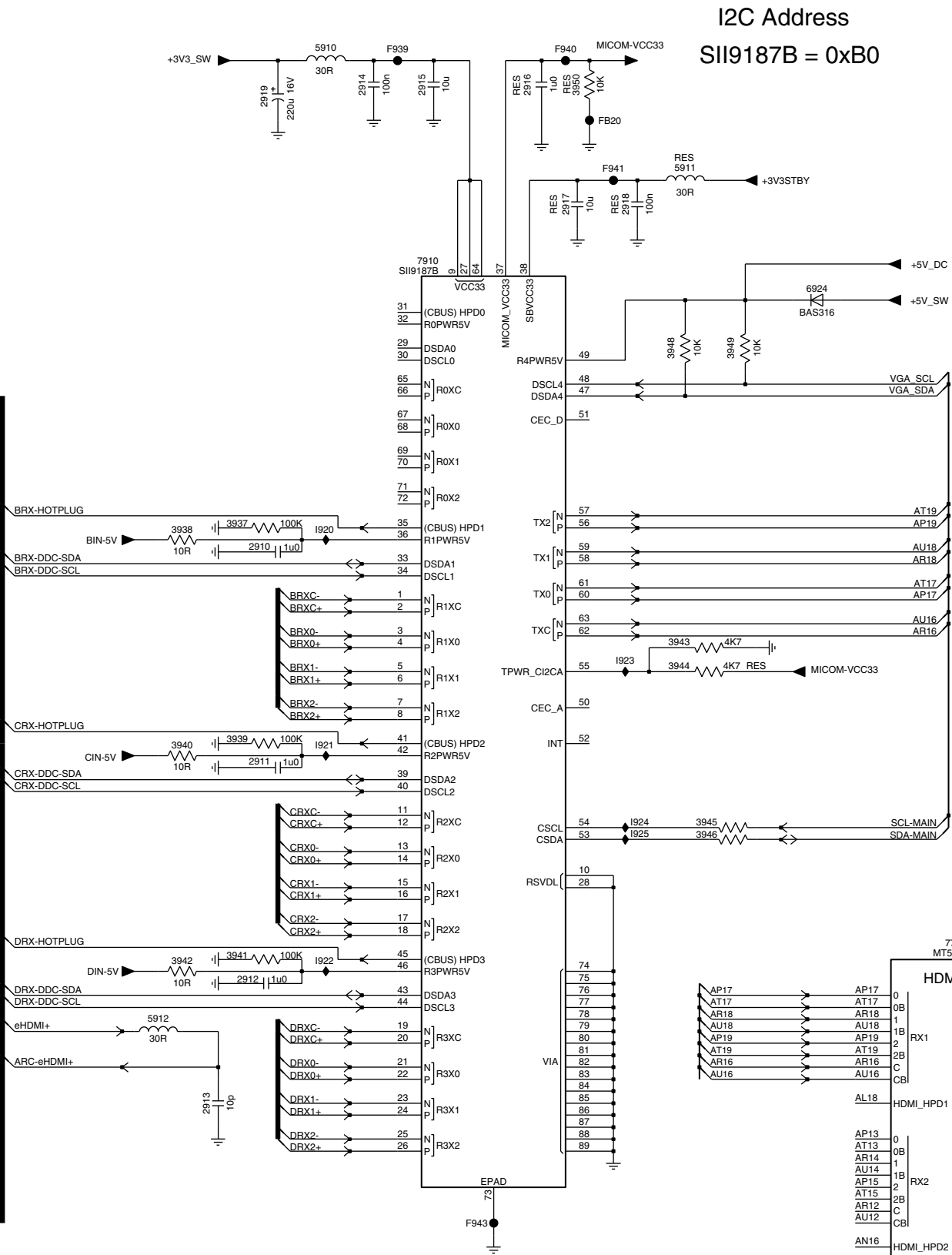
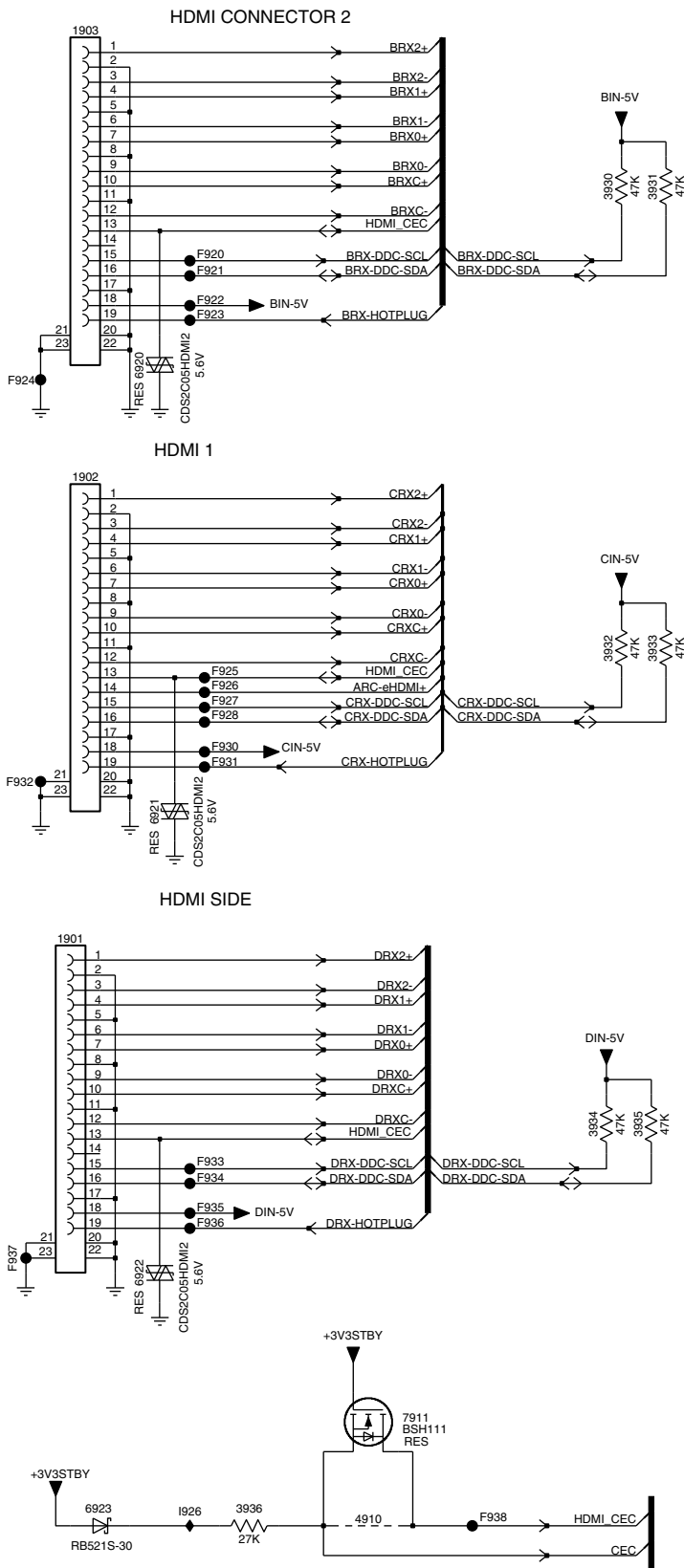
10-13 B05 313912365231

HDMI & Multiplexer

B05A

HDMI & Multiplexer

B05A



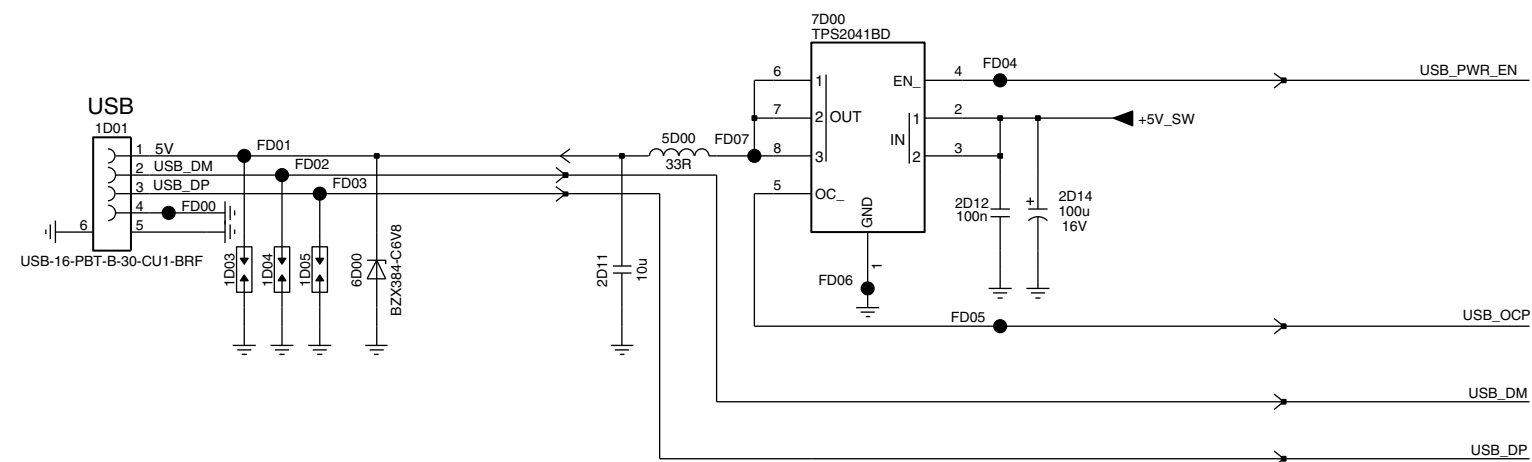
PCB SB SSB
BERLINALE BRZ DIG

3139 123 6523

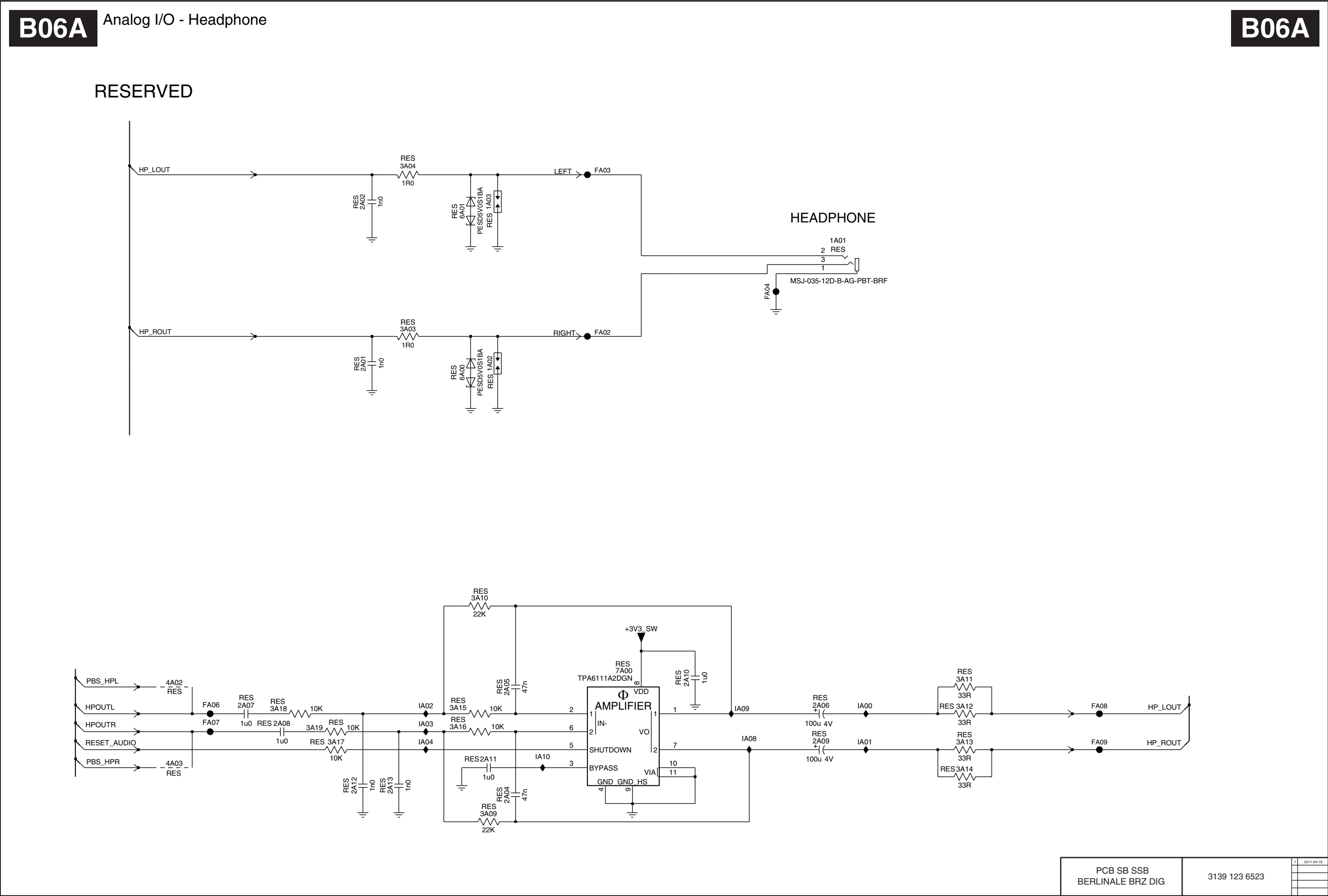
1
2011-04-18

B05B USB

B05B



10-14 B06 313912365231
Analog I/O - Headphone



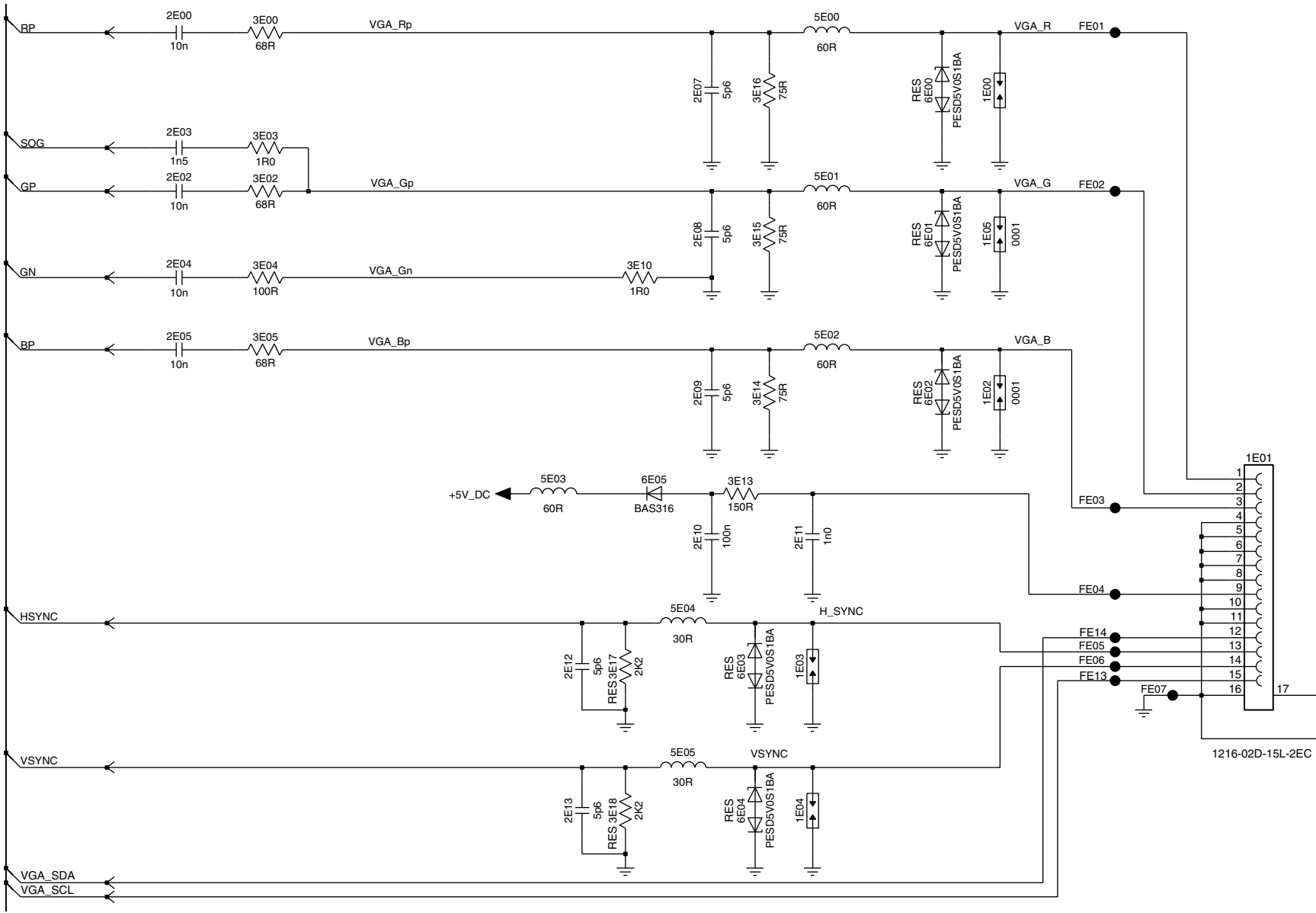
PCB SB SSB BERLINALE BRZ DIG	3139 123 6523	1	2011-04-18

VGA

B06D

VGA

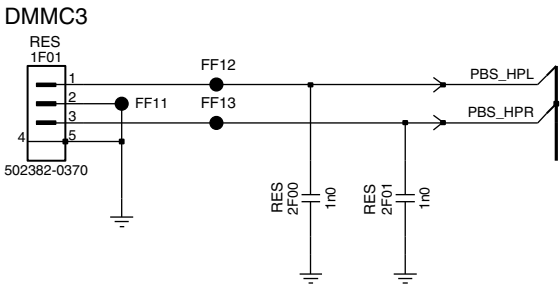
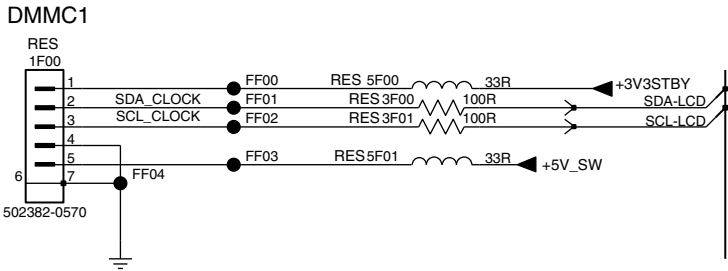
B06D



10-15 B07 313912365231
Hospitality

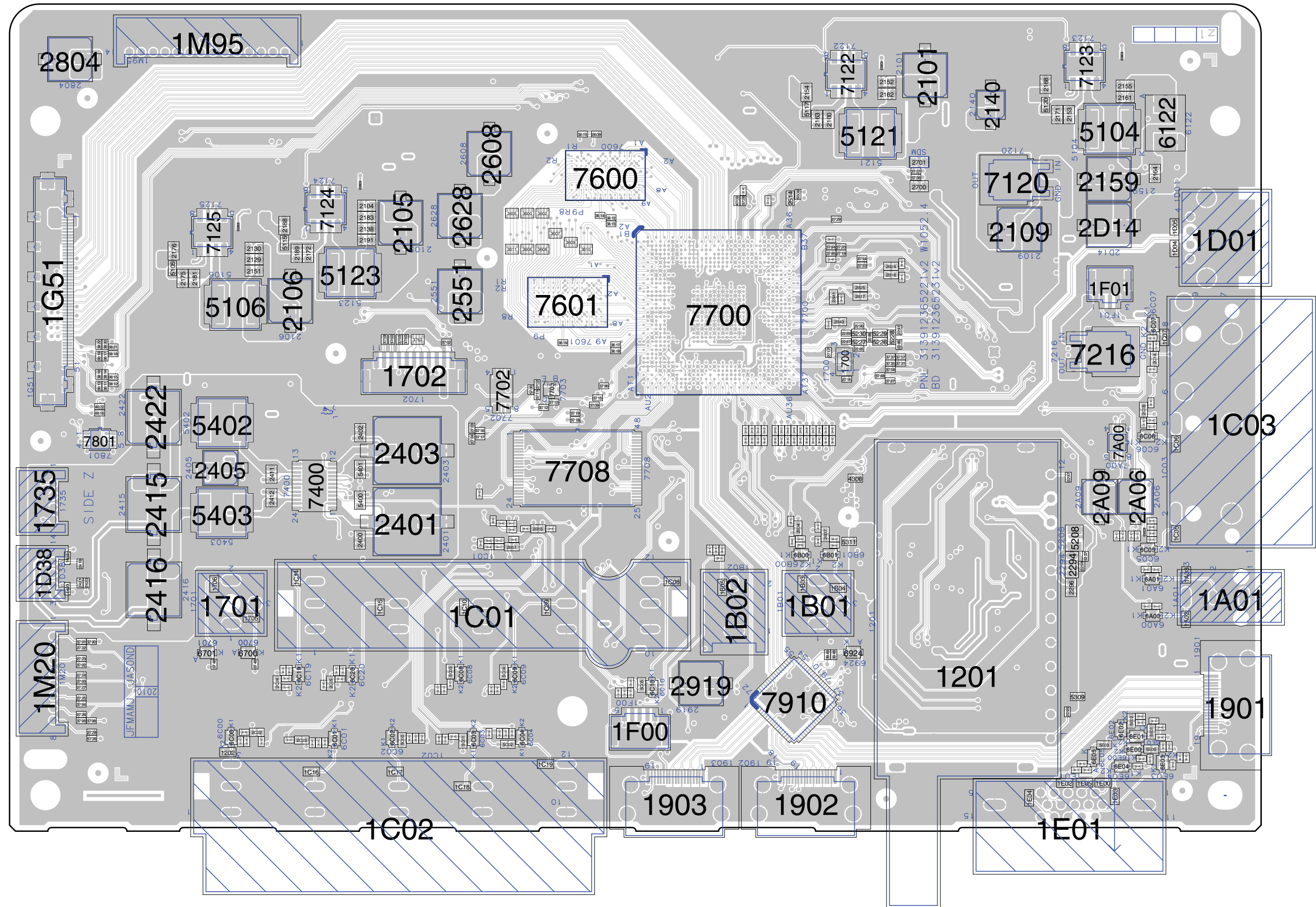
B07 Hospitality

B07

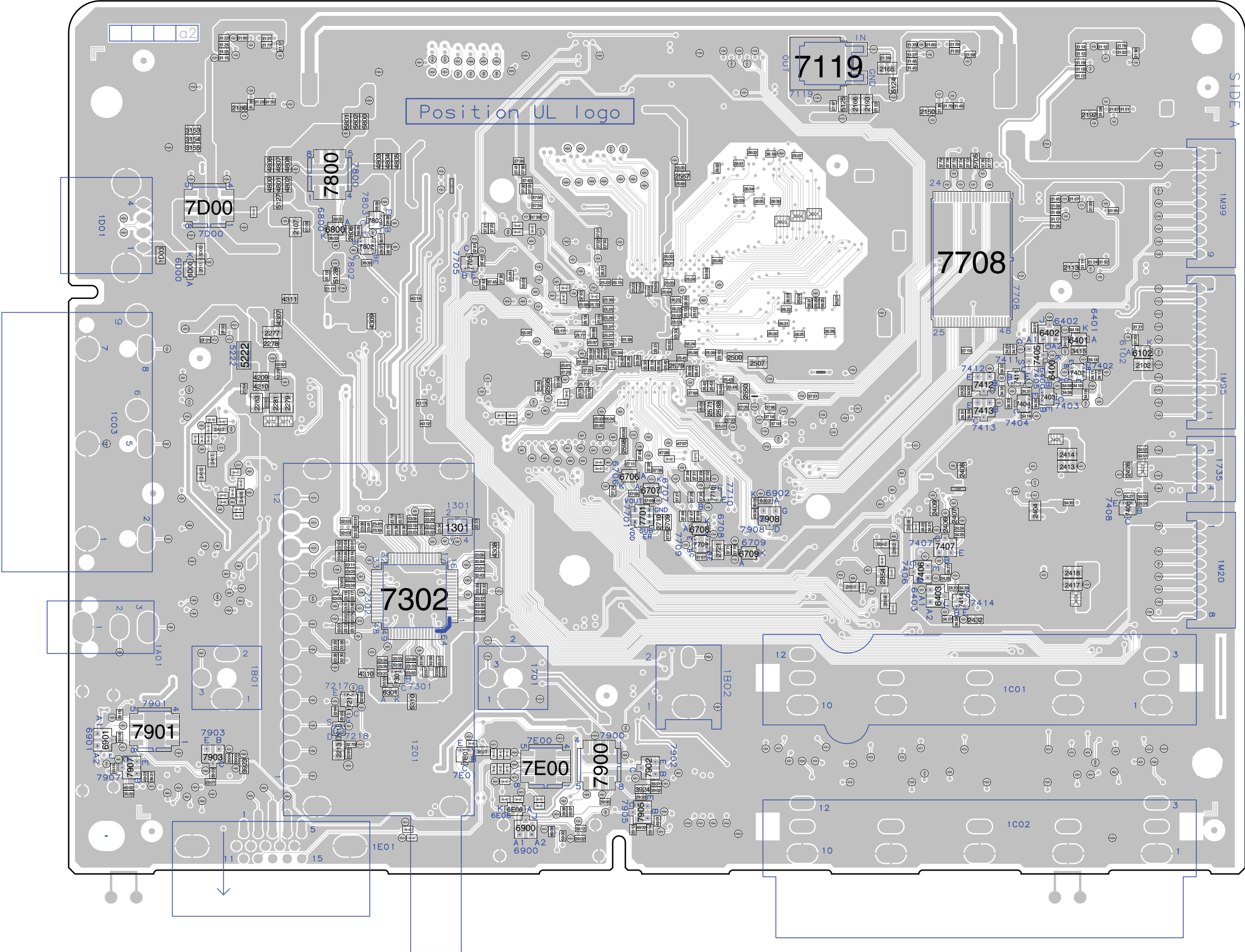


PCB SB SSB BERLINALE BRZ DIG	3139 123 6523	1	2011-04-18

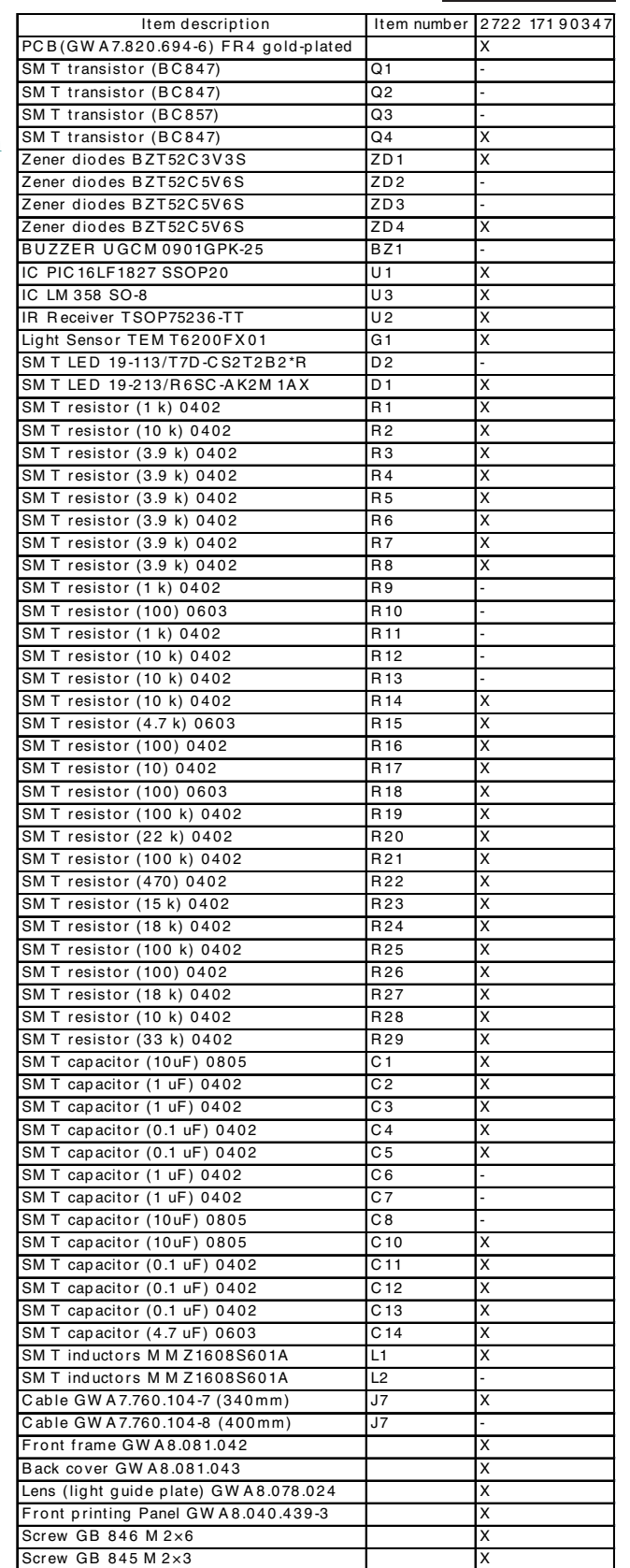
10-16 313912365231 SSB Layout
Overview top side



Overview bottom side

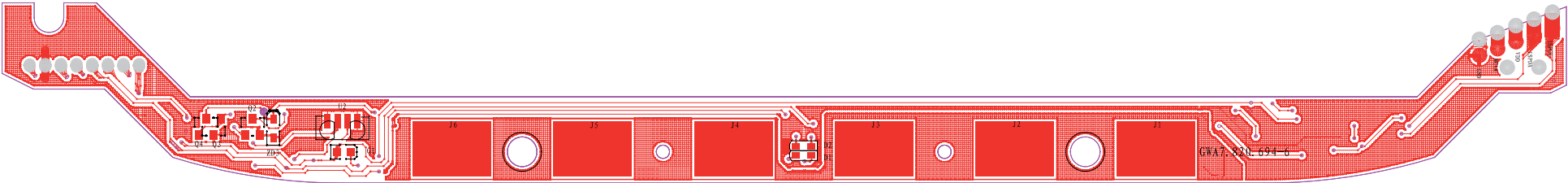


E Leading Edge Module

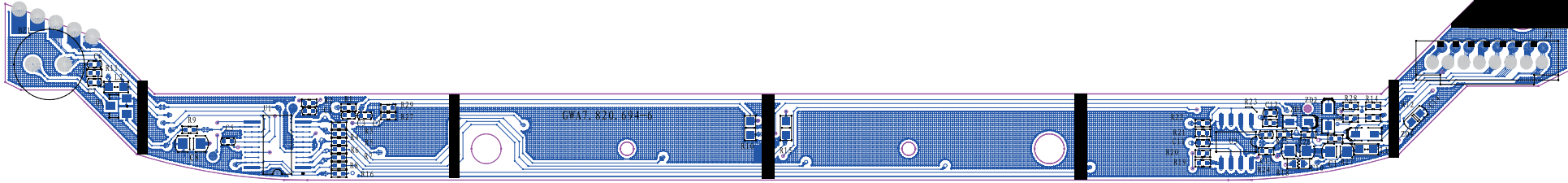


Layout

Layout top



Layout bottom



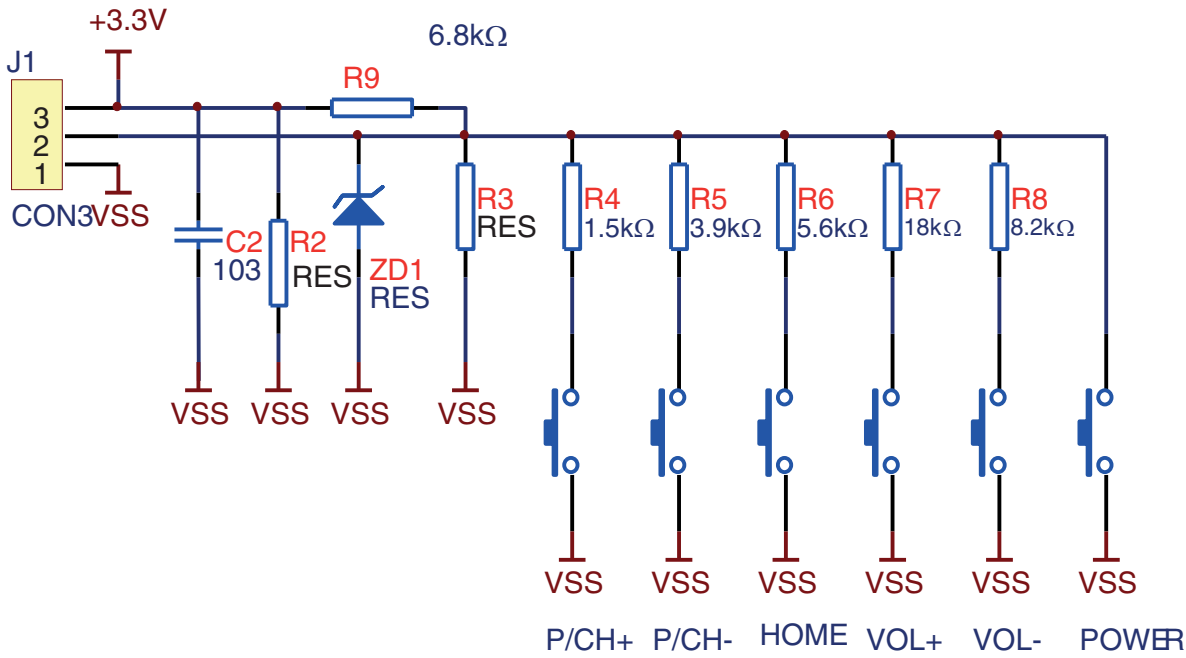
Leading Edge Module Berlinale layout	2722 171 9034	7	2011-04-21

10-18 E 272217190276 KEYBOARD
Thriller Keyboard Module

E

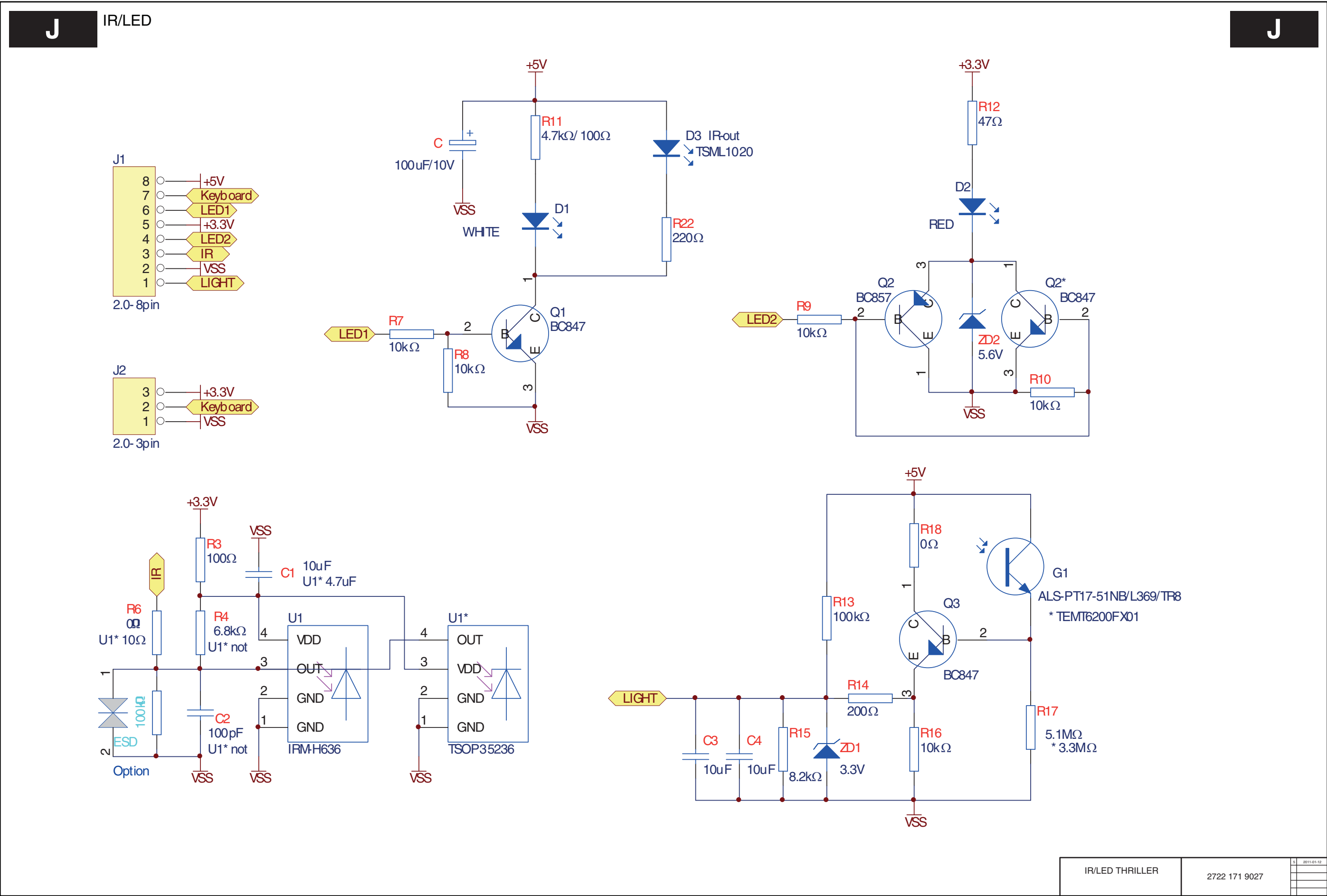
Keyboard

E



KEYBOARD	2722 171 9027	6	2011-01-12

10-19 J 272217190275 IR/LED
IR/LED Module



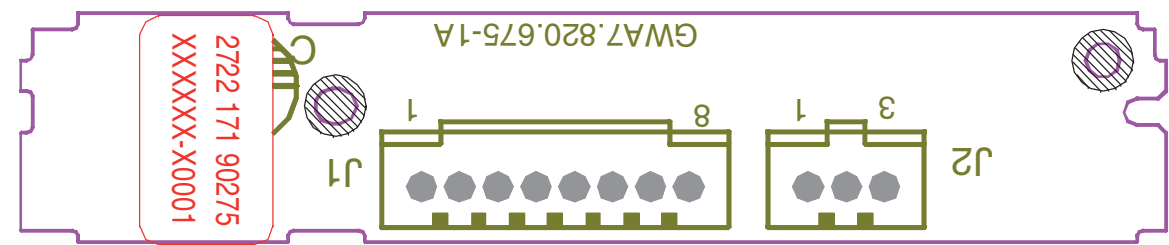
IR/LED THRILLER

2722 171 9027

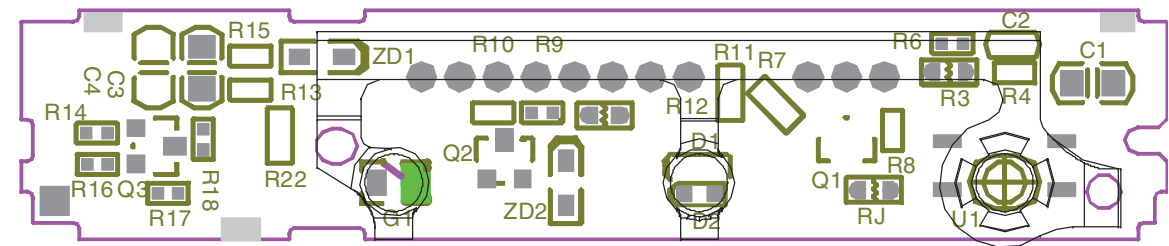
5	2011-01-12

Layout

Layout top



Layout bottom

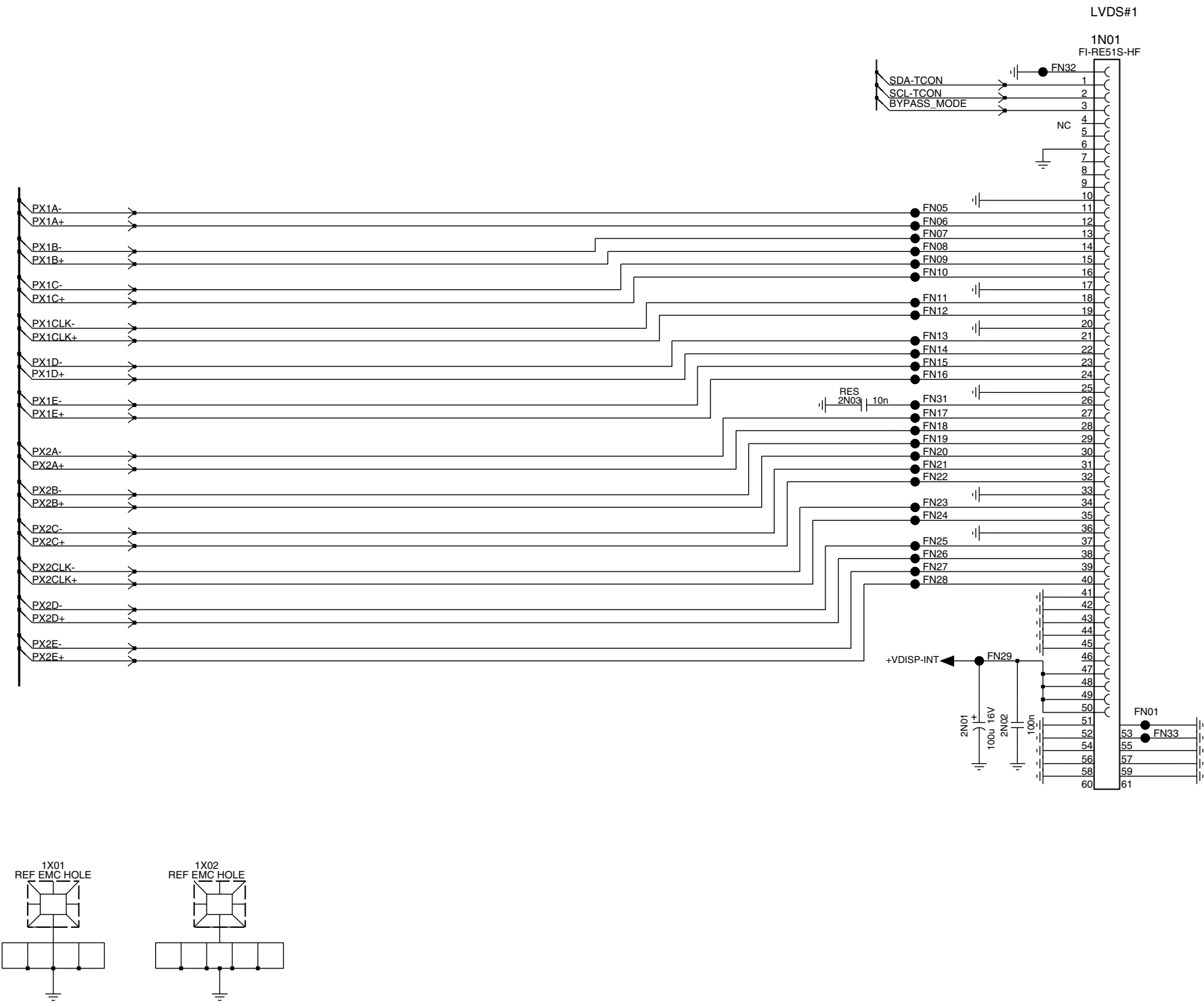


IR/LED THRILLER LAYOUT	2722 171 9027	5	2011-01-12

10-20 T01 313912365071
LVDS Display

T01A LVDS Display

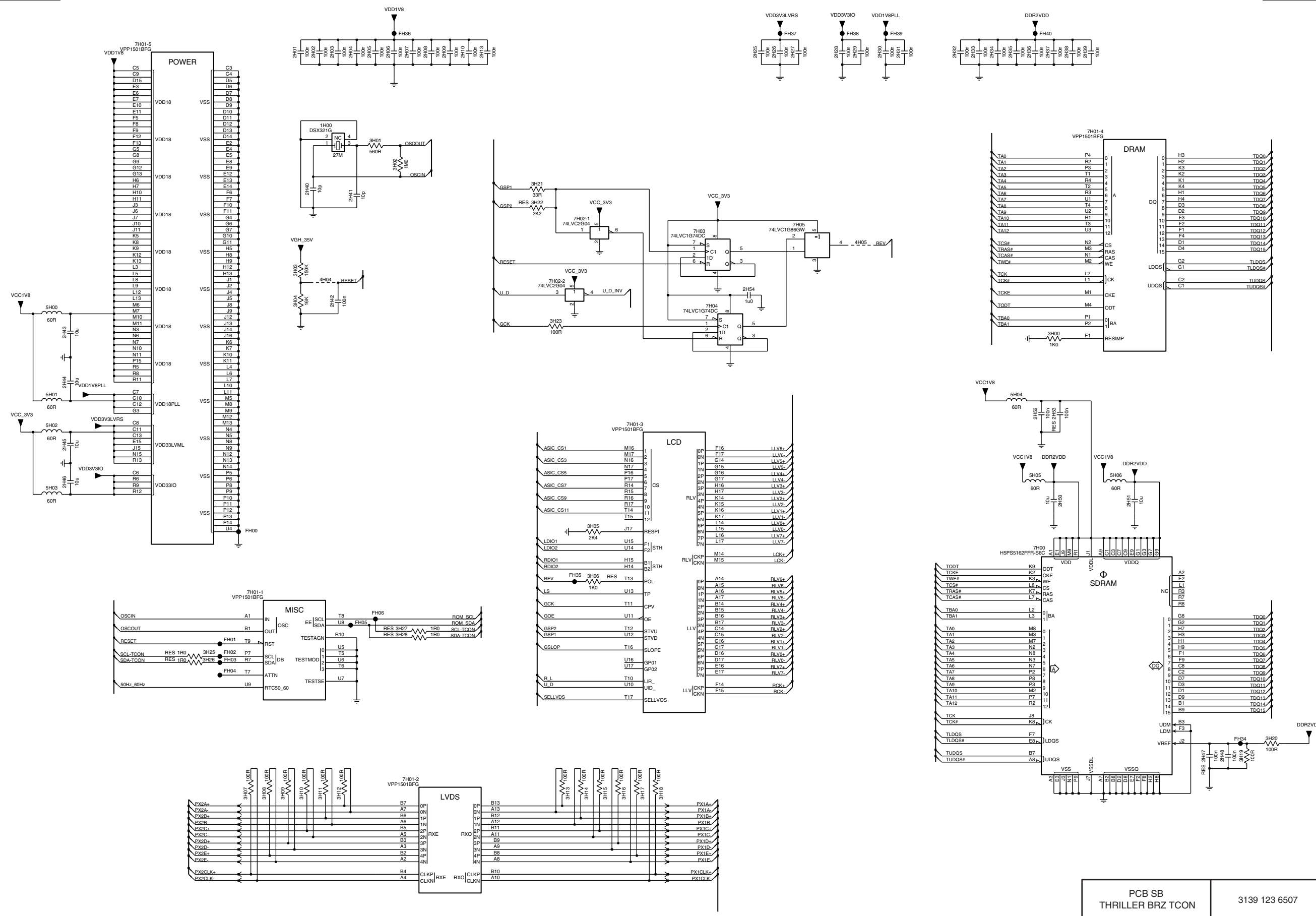
T01A



TCON Control

T01B

T01B

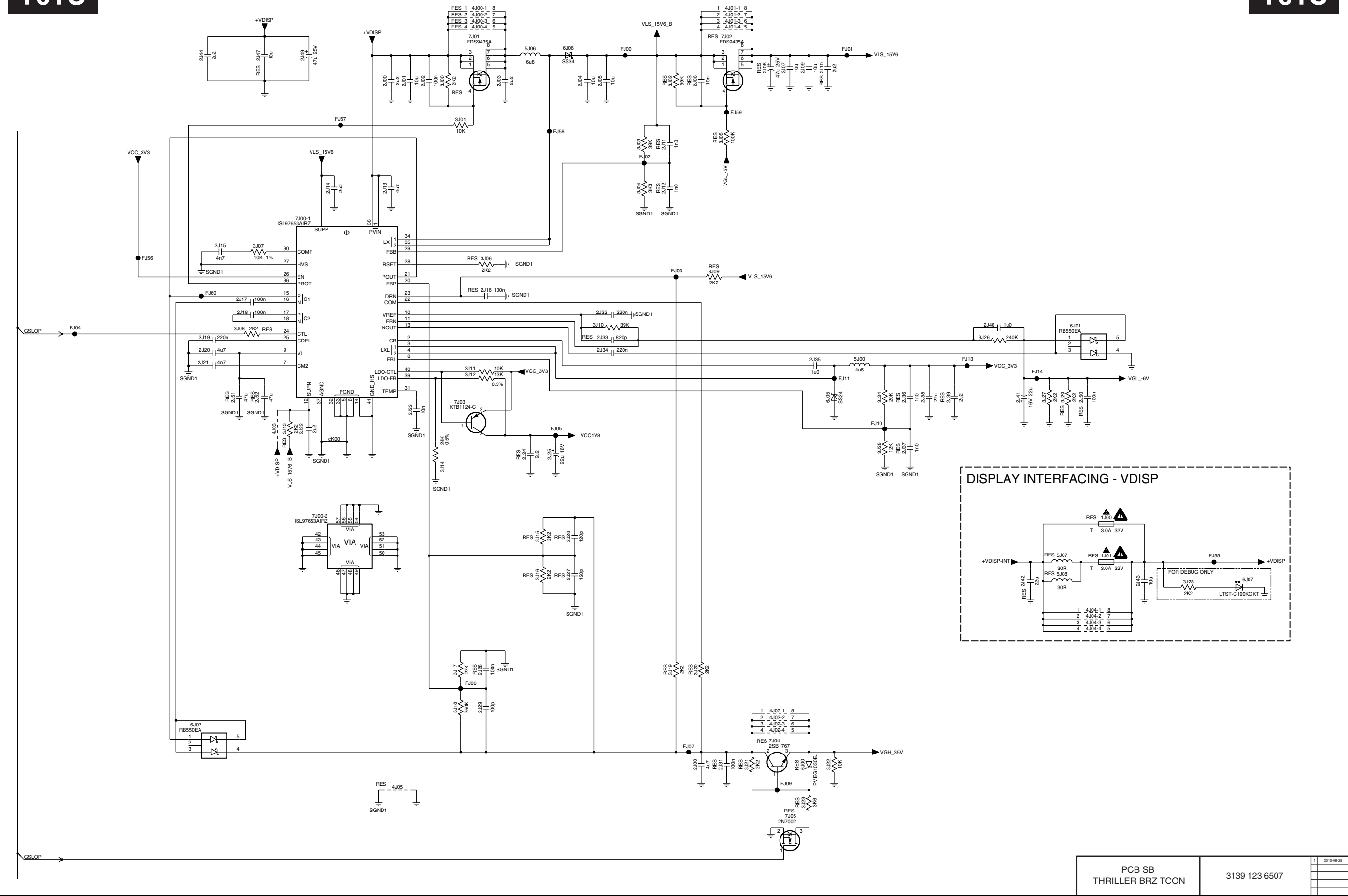


TCON DC/DC

T01C

TCON DC/DC

T01C



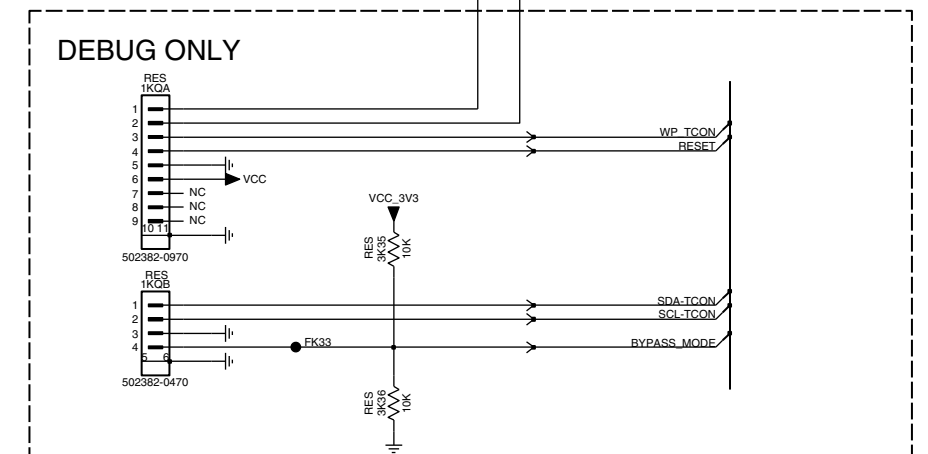
PCB SB
THRILLER BRZ TCON

3139 123 6507

1	2015-06-23

P Gamma & Vcom & NVM

T01D

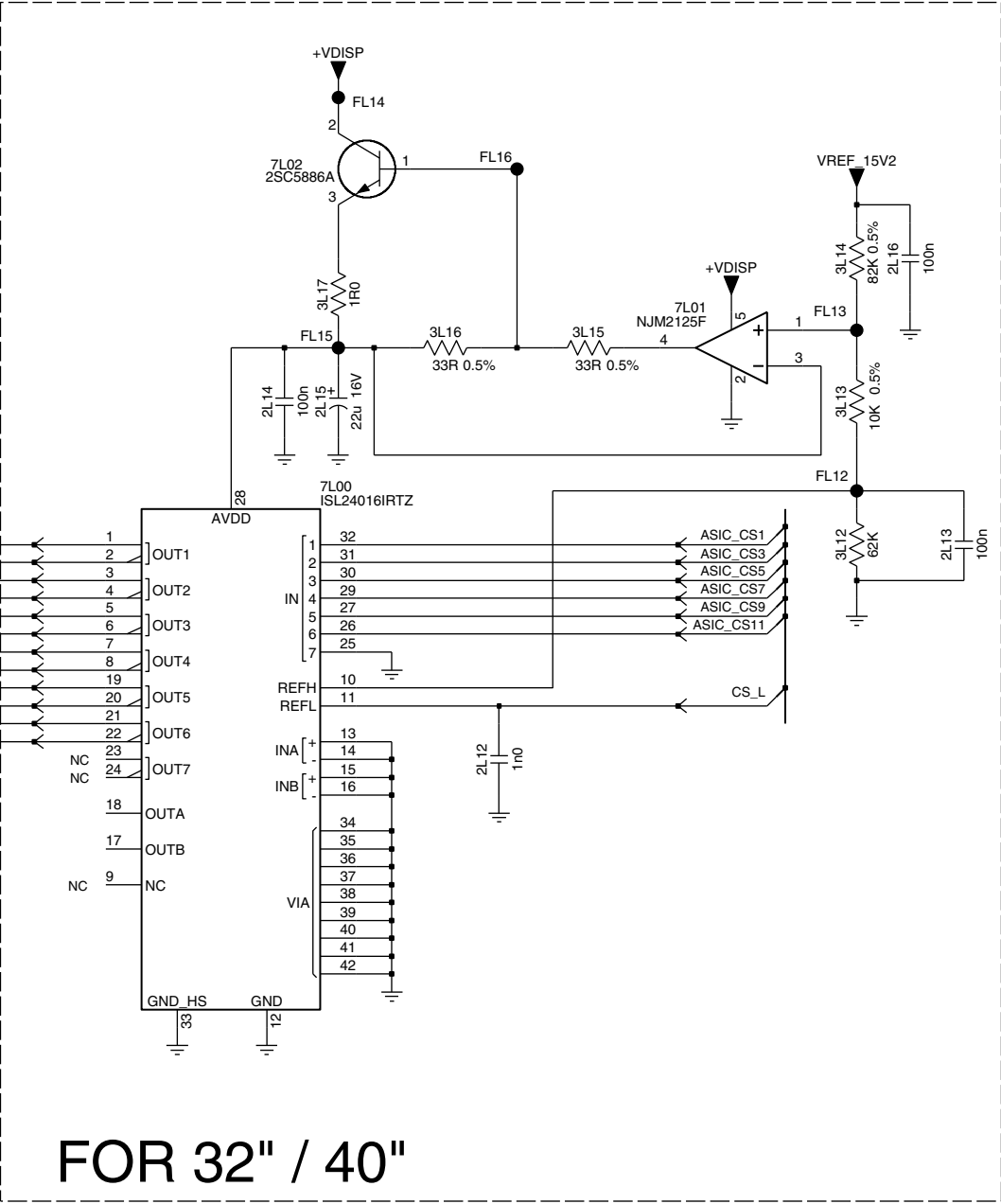
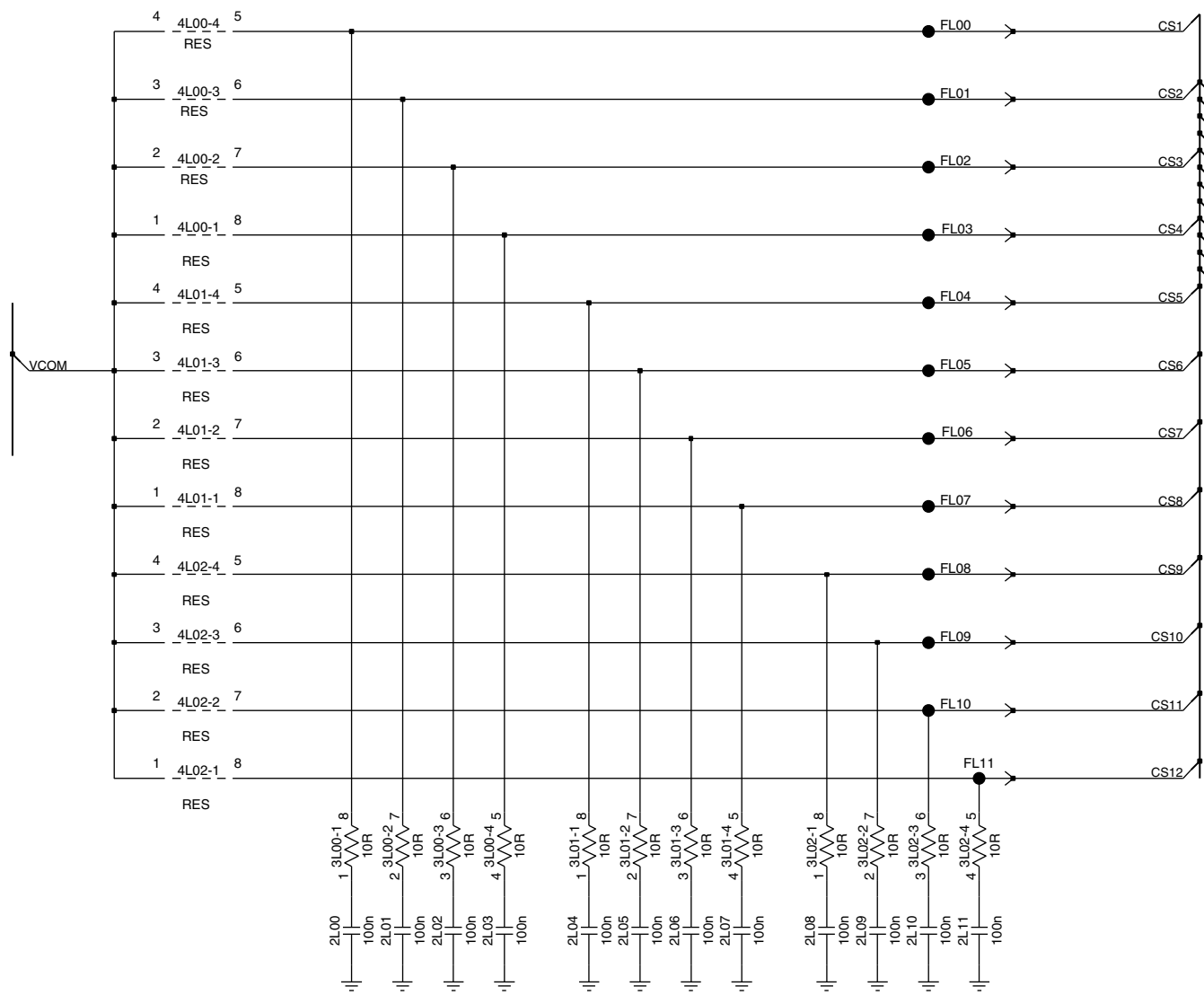


ITEM NO.	32"	40"
3K45	5K1	-
3K51	-	10K
4K01	-	JUMPER
4K02	-	JUMPER
4K03	-	JUMPER
4K04	-	JUMPER
4K09	JUMPER	-
4K13	JUMPER	-
4K16	JUMPER	-
4K18	JUMPER	-

MPD

T01E MPD

T01E



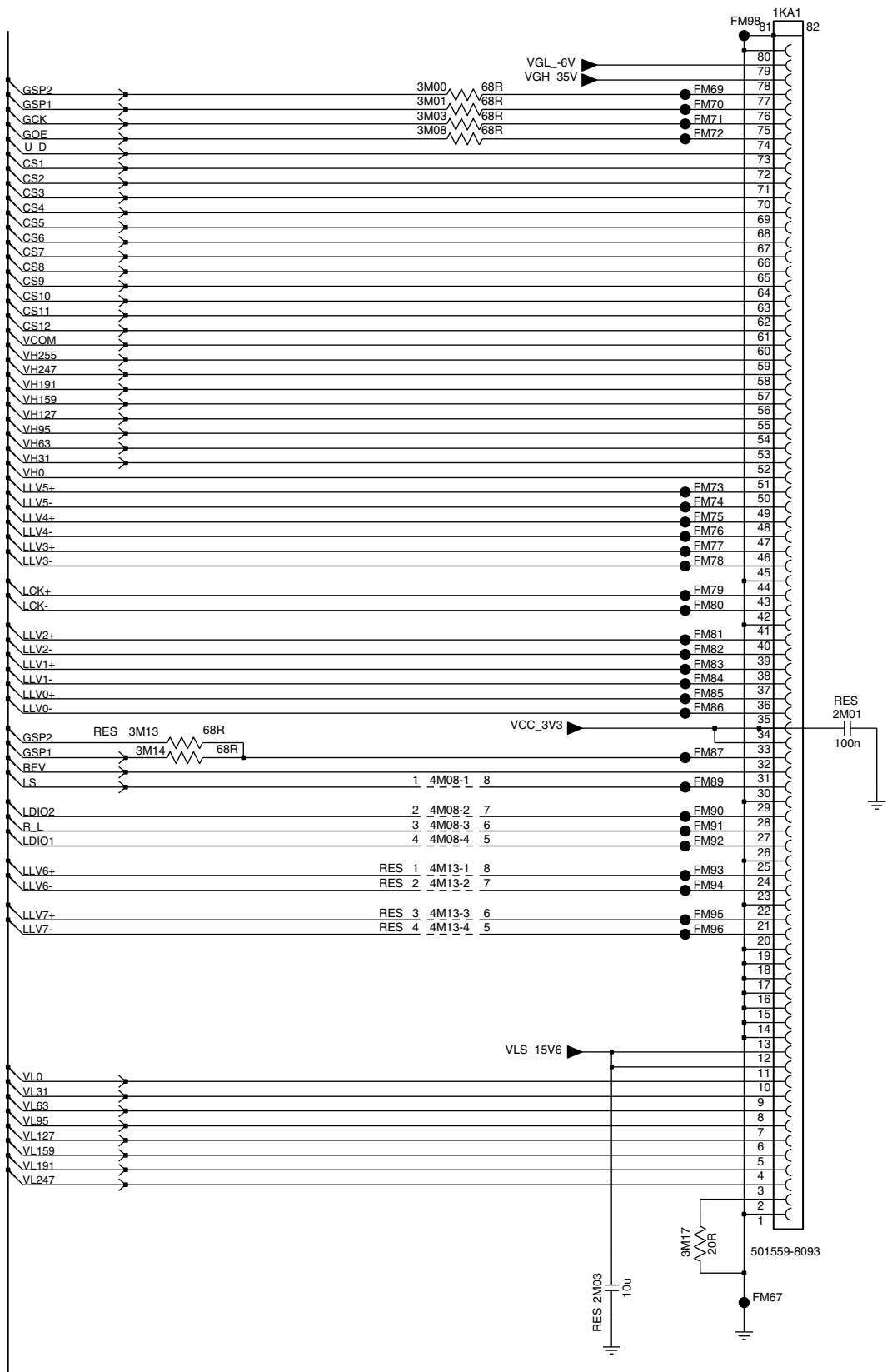
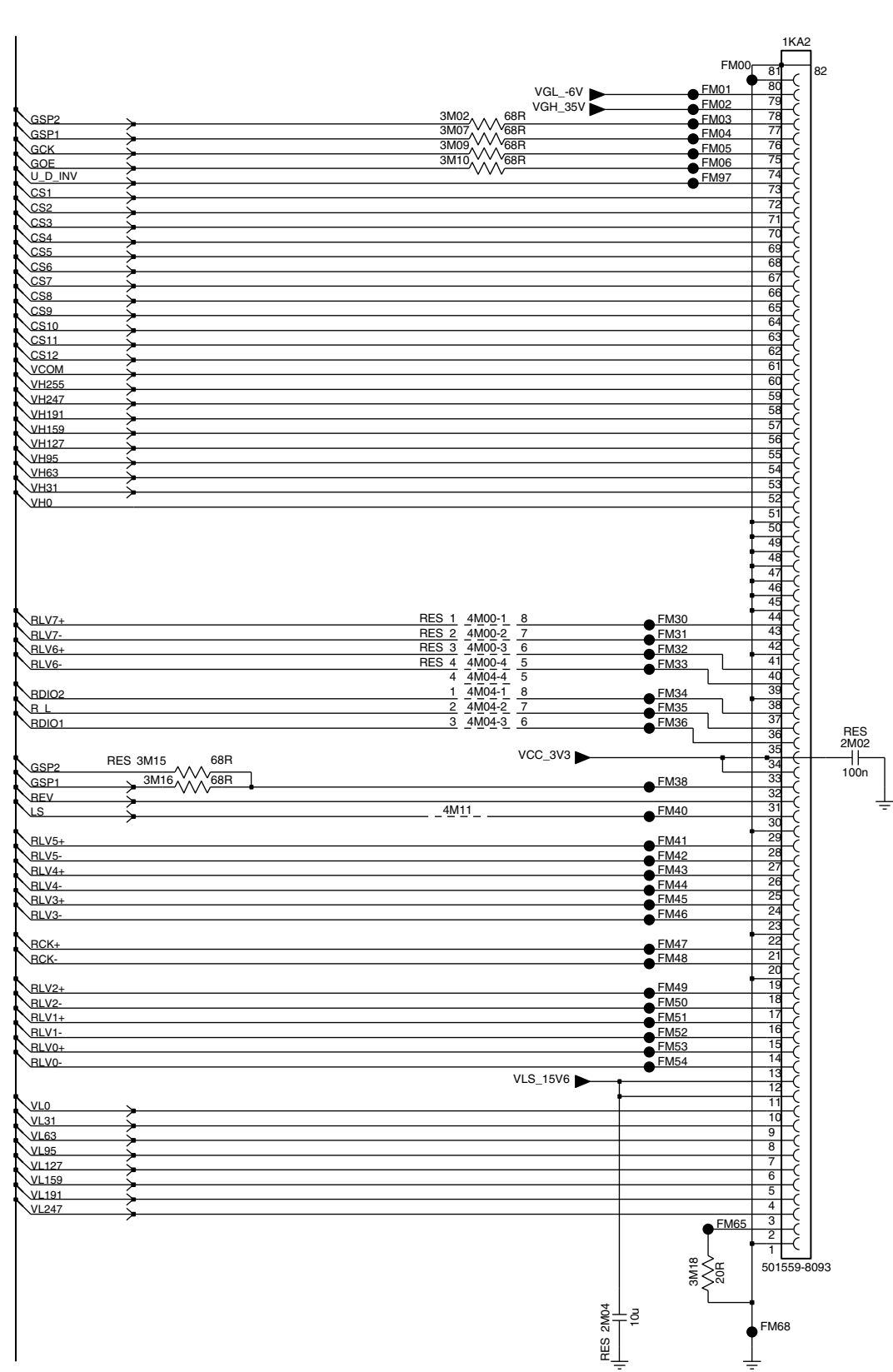
ITEM NO.	32"	40"
3L12	47K	68K
3L13	2K2	2K
3L14	56K	82K

Mini LVDS

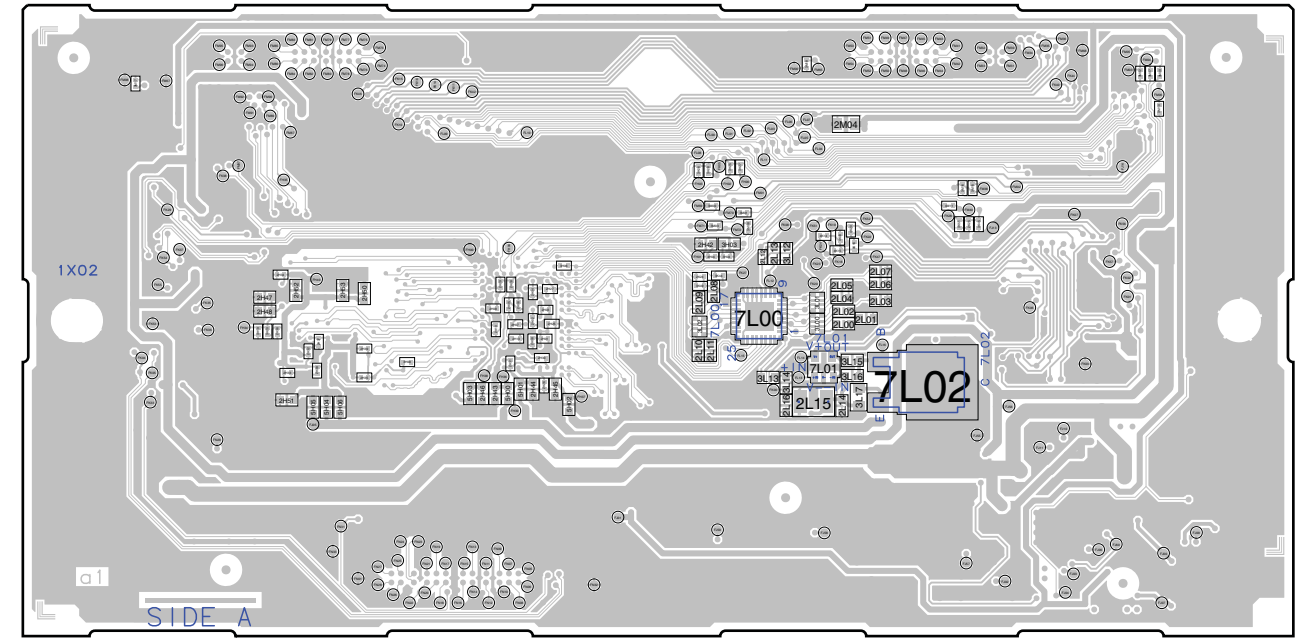
T01F

Mini LVDS

T01F



Overview top/bottom side



19130_042_110428.eps
110428

11. Styling Sheets

11-1 Styling Sheet Thriller 32"

THRILLER 32"

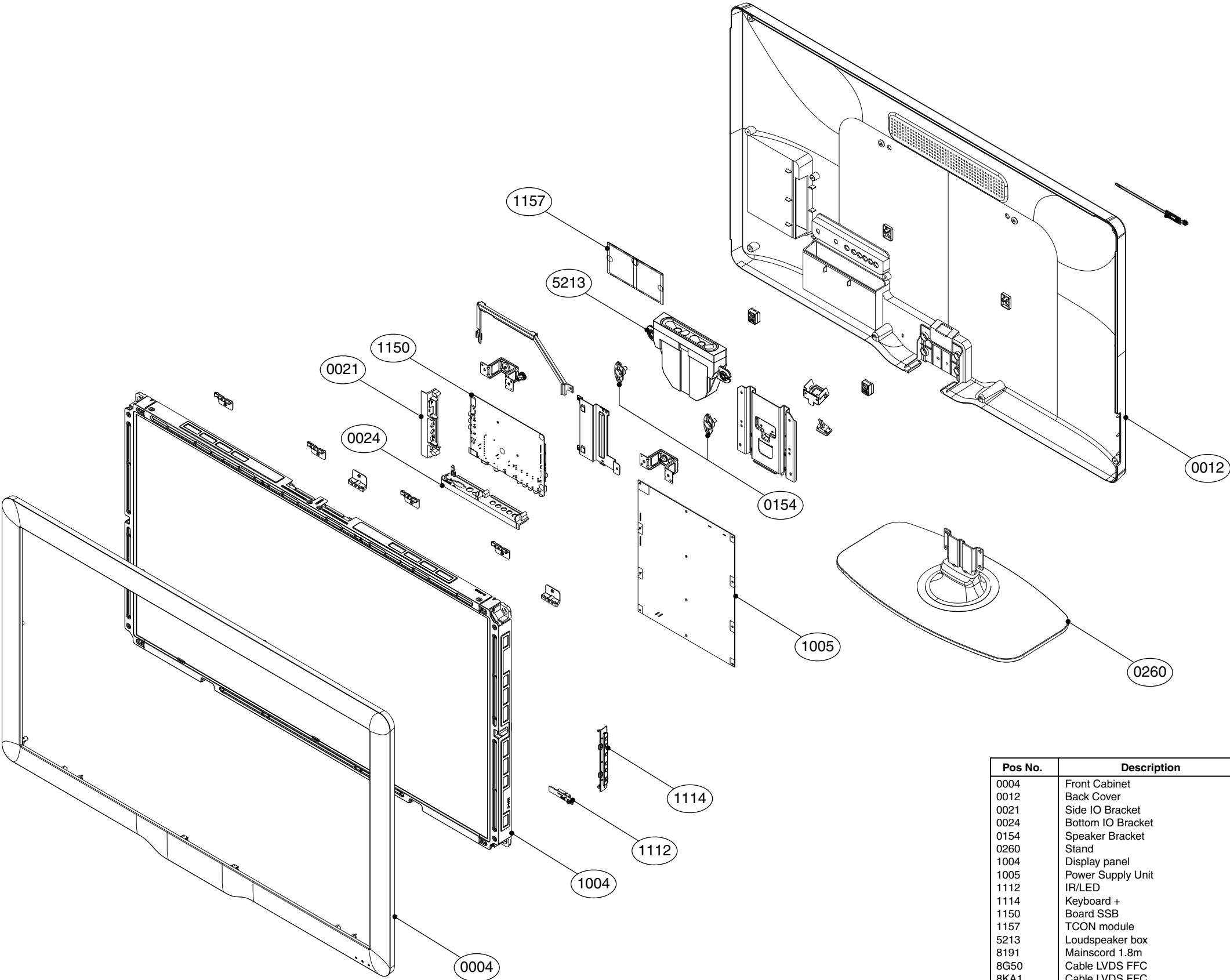
The diagram illustrates the exploded view of the Thriller 32" TV assembly. Key components and their part numbers are as follows:

- 0004: Front Cabinet
- 0012: Back Cover
- 0021: Side IO Bracket
- 0024: Bottom IO Bracket
- 0154: Speaker Bracket
- 0260: Stand
- 1004: Display panel
- 1005: Power Supply Unit
- 1112: IR/LED
- 1114: Keyboard +
- 1150: Board SSB
- 5213: Loudspeaker box
- 8191: Mainscord 1.8m
- 8G51: Cable LVDS FFC
- 1085: Remote Control

Pos No.	Description	Remarks
0004	Front Cabinet	
0012	Back Cover	
0021	Side IO Bracket	
0024	Bottom IO Bracket	
0154	Speaker Bracket	
0260	Stand	
1004	Display panel	
1005	Power Supply Unit	
1112	IR/LED	
1114	Keyboard +	
1150	Board SSB	
5213	Loudspeaker box	
8191	Mainscord 1.8m	Not Displayed
8G51	Cable LVDS FFC	Not Displayed
1085	Remote Control	Not Displayed

11-2 Styling Sheet Thriller 40"

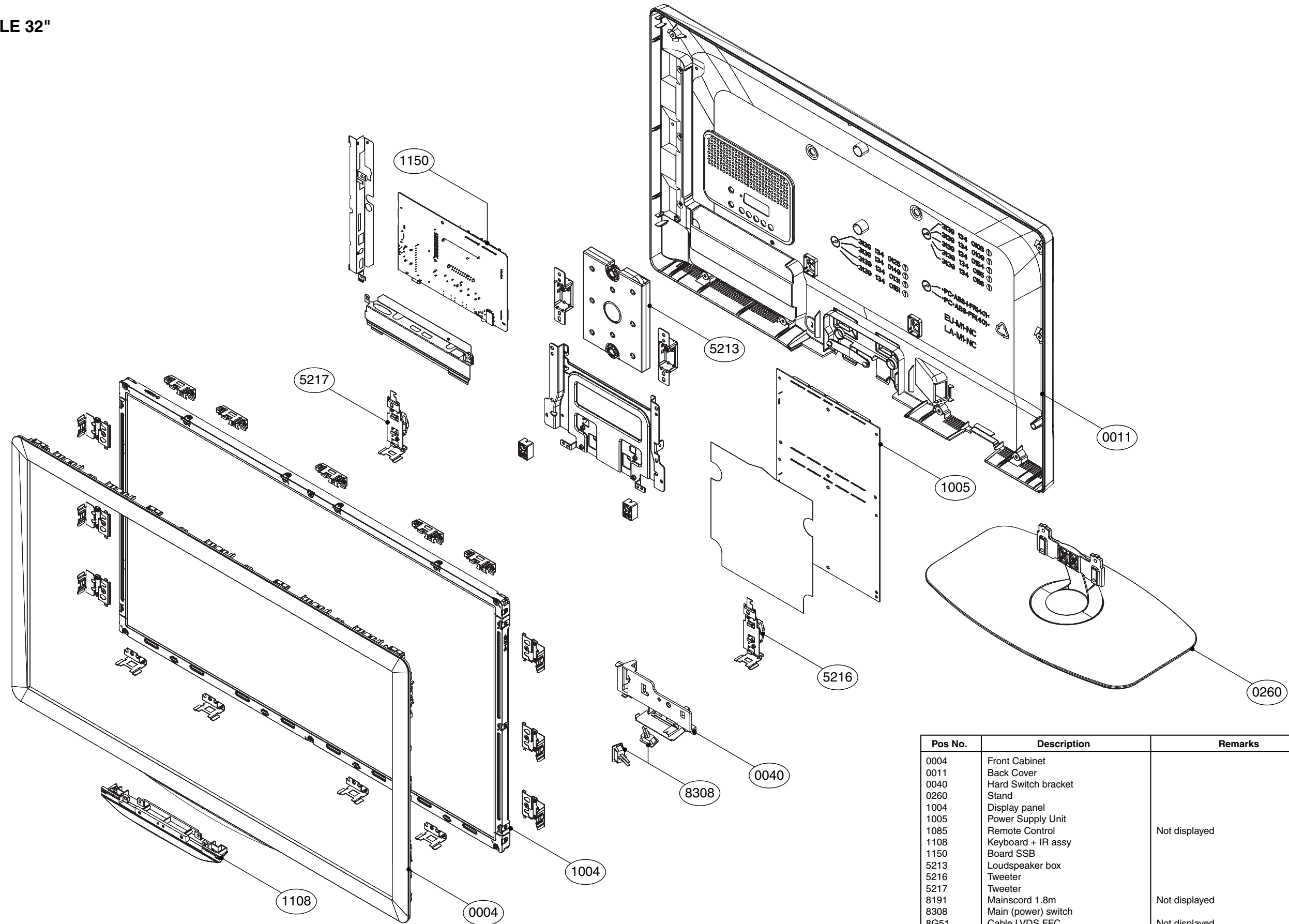
THRILLER 40"



Pos No.	Description	Remarks
0004	Front Cabinet	
0012	Back Cover	
0021	Side IO Bracket	
0024	Bottom IO Bracket	
0154	Speaker Bracket	
0260	Stand	
1004	Display panel	
1005	Power Supply Unit	
1112	IR/LED	
1114	Keyboard +	
1150	Board SSB	
1157	TCON module	
5213	Loudspeaker box	
8191	Mainscord 1.8m	Not Displayed
8G50	Cable LVDS FFC	Not Displayed
8KA1	Cable LVDS FFC	Not Displayed
8KA2	Cable LVDS FFC	Not Displayed
1085	Remote Control	Not Displayed

11-3 Styling Sheet Berlinale 32"

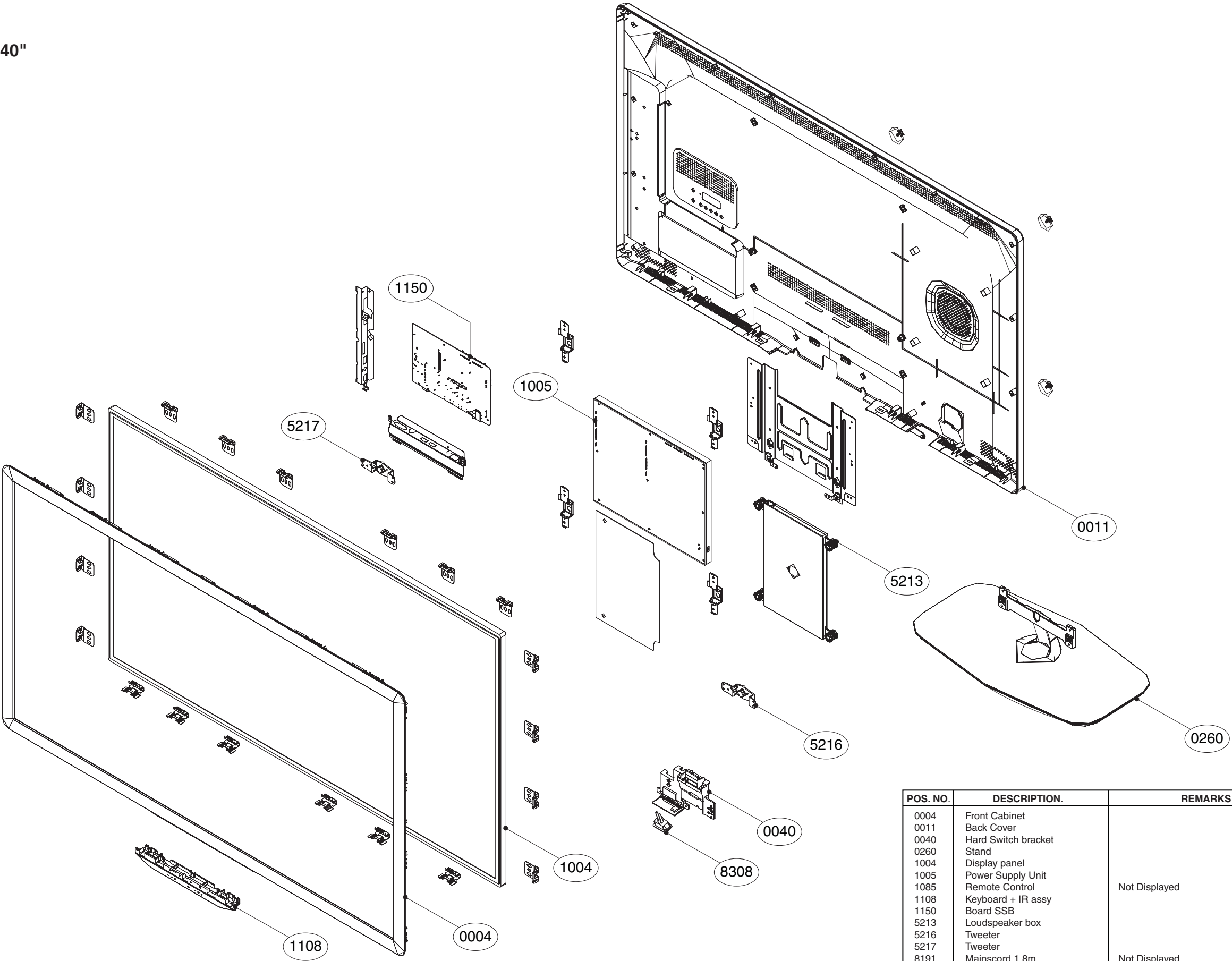
BERLINALE 32"



Pos No.	Description	Remarks
0004	Front Cabinet	
0011	Back Cover	
0040	Hard Switch bracket	
0260	Stand	
1004	Display panel	
1005	Power Supply Unit	
1085	Remote Control	Not displayed
1108	Keyboard + IR assy	
1150	Board SSB	
5213	Loudspeaker box	
5216	Tweeter	
5217	Tweeter	
8191	Mainscord 1.8m	Not displayed
8308	Main (power) switch	
8G51	Cable LVDS FFC	Not displayed

11-4 Styling Sheet Berlinale 40"

BERLINALE 40"



POS. NO.	DESCRIPTION.	REMARKS
0004	Front Cabinet	Not Displayed
0011	Back Cover	
0040	Hard Switch bracket	
0260	Stand	
1004	Display panel	Not Displayed
1005	Power Supply Unit	
1085	Remote Control	
1108	Keyboard + IR assy	
1150	Board SSB	Not Displayed
5213	Loudspeaker box	
5216	Tweeter	
5217	Tweeter	
8191	Mainscord 1.8m	Not Displayed
8308	Main (power) switch with cable	
8G51	Cable LVDS FFC	Not Displayed